

The Canadian Medical Association Journal



Editor

H. E. MacDERMOT, M.D., F.R.C.P.[C.]

19106
Published by

THE CANADIAN MEDICAL ASSOCIATION

1950

The Canadian Medical Association Journal

Vol. 62

JANUARY, 1950

No. 1

THE NATIONAL HEALTH SERVICE IN ENGLAND*

William Magner, M.D.

Toronto, Ont.

IMMEDIATELY prior to the first meeting of the third General Assembly of the World Medical Association on October 10, 1949, I spent seventeen days in and around London, in an attempt to learn something of the working of the National Health Service. During this time I visited two medical schools, four teaching hospitals, and two non-teaching hospitals; and I had formal interviews or casual conversations about the Service, with some fifty medical men. My thanks are due to those busy people who gave me their time and hospitality, and in particular to Dr. Charles Hill of the B.M.A., who made my peregrinations easy and pleasant.

THE ADMINISTRATIVE STRUCTURE AND SCOPE OF THE SERVICE

Full details as to the administrative structure and the scope of the National Health Service are available, in a clear and succinct form, in a book by Hill and Woodcock,¹ published some few months ago, so I will attempt no more than a synopsis of its main provisions.

At the top of the Service is the Minister of Health, who has sweeping powers. There is a Central Health Services Council, which is an advisory body of 41 members, 21 of whom are doctors. Sitting on this Council are the Presidents of the three Royal Colleges, the President of the General Medical Council, the Chairman of Council of the British Medical Association, and the Chairman of the Society of Medical Officers of Health. It is the duty of this Council to advise the Minister on general matters relating to the services provided under the Act. It must make an annual report to the Minister on its work, and on the work of a number of standing committees which have been set up. The Minister is required to present this report to parliament, unless there is any reason of public interest for not doing so, when he may withhold it, in whole or in part, after consultation with the Council.

Teaching hospitals are managed by Boards of Governors, responsible to the Minister. Non-teaching hospitals are grouped into regions, and are controlled by Regional Hospital Boards, responsible to the Minister. Regional Boards appoint a Hospital Management Com-

mittee for each hospital or group of hospitals under their control. Boards of Governors of teaching hospitals appoint all their medical staff. Regional Hospital Boards appoint specialists senior to the rank of registrar. Hospital Management Committees appoint all members of the medical staff up to and including the grade of registrar. Specialist vacancies on hospital staffs must be advertised in two or more medical journals circulating through England and Wales.

The salaries of whole-time members of hospital staffs vary from £350 a year for junior house officers to £2,750 a year for senior consultants. In addition, 4% of consultants will receive, as a special or distinction award, an extra £2,500 a year, 10% will receive an extra £1,500 a year, and 20% will receive an extra £500 a year. Part-time specialists will receive a proportion of the salary which they would receive as full-time workers, determined by the number of hours per week which they devote to hospital duties. Part-time specialists are also eligible for distinction awards. Members of hospital staffs are entitled to holiday leave, sick leave, study leave and pension on retirement.

Under the Act, general practitioner services, dental services, supplementary ophthalmic services, and pharmaceutical services are administered by Local Executive Councils, responsible to the Minister. Each Council is composed of a chairman, appointed by the Minister, and twenty-four others, twelve medical men and twelve laymen. Under the executive councils are Local Medical Committees, representative of the practitioners of the area. Entry into general practice, under the Act, is controlled by another body, the Medical Practices Committee, which is composed of seven general practitioners and two laymen. This committee names certain areas as having a sufficient number of doctors for the needs of the population, and it may refuse an application by a practitioner to enter any such "closed" area for the purpose of public practice. Consent to enter practice in "open" areas will be automatic, unless the number of applicants exceeds the number required for the area. In such cases, the Medical Practices Committee will, after consultation with the Local Executive Council, make a selection from those who apply, the unsuccessful applicants having the right to appeal to the Minister.

A man practising by himself is not permitted to have more than 4,000 people on his list. If two or more men are practising in partnership, the number on the list of any one of them shall not exceed 5,000, and the average number on the lists of both or all the partners shall not exceed 4,000. The practitioner is paid from a central pool. It is expected that he will receive about eighteen shillings per annum for each public patient on his list; at present he is getting quarterly payments at the rate of fifteen or sixteen shillings per annum, and an adjustment will be made at the end of the year. In addition he is paid for any drugs which he has to dispense, for services to local health authorities, and for treatment of temporary

* A Report read to the Executive Committee of the Canadian Medical Association, November 28, 1949.

residents in his district. In rural areas there is a generous mileage payment. If he is certified by a Local Obstetric Committee as being "a practitioner having obstetric experience", he is paid seven guineas for each maternity case, whether the patient is or is not on his own general list. If he is not so certified, he may attend only maternity patients who are on his own general list, and for this he is paid five guineas per case. If he has satisfied his Local Ophthalmic Services Committee that he is qualified to do so, he may test eye-sight and prescribe spectacles, and for this he receives twenty-five shillings per case.

A fixed annual payment of £300 a year may be made to those practitioners who prove to the satisfaction of the Local Executive Council that there is justification for it. Justification might exist in the case of a doctor starting a new practice or working up a small one, in the case of a doctor who on account of age or ill health is unable to do as much as he has done in the past, or in the case of a rural doctor in a sparsely populated area. Justification might also exist in the case of a doctor who can show that he is suffering hardship because of a sharp drop in his income attributable to the introduction of the new Service. When a fixed annual payment is made, the capitation fees payable to the practitioner receiving it will be reduced by one-seventh. Special inducement payments may be made to encourage doctors to practise in sparsely populated or unpopular areas. The Government will contribute towards the cost of a general practitioner's superannuation benefits a sum equivalent to 8% of his *net* remuneration.

It is unlawful for a practitioner whose name is entered on an Executive Council list to sell the goodwill or any part of the goodwill of his medical practice. Heavy penalties are provided for a breach of this regulation. However, general practitioners who joined the Service on or before the "appointed day" (July 5, 1948) are entitled to compensation for the loss incurred through being unable thereafter to sell their practices. The acceptance of compensation does not mean that a practitioner may not, after retirement from public practice, practise privately in the same area. In general compensation will not be paid until retirement or death of the practitioner, but an advance payment on account may be made to

practitioners who can prove that they are suffering hardship. Compensation is based on the average gross yearly receipts in the last two accounting years immediately preceding the appointed day. Interest at the rate of 2¾% will be paid from the "appointed day" until the time when compensation is paid. It should be emphasized that only those who have joined the Service as general practitioners are subject to the prohibition of the buying and selling of practices.

Hospital and specialist services are available to every member of the community, and to every visitor to the country, on the recommendation of a general practitioner. It does not matter whether the general practitioner is or is not a public practitioner, or whether the patient's name is or is not on the list of a public practitioner, hospital and specialist services are available. A patient may obtain his general practitioner services privately without losing the right to obtain his hospital and specialist services at the public expense, or he may obtain his general practitioner services under the scheme and his specialist services privately, either in the specialist's consulting rooms or in the private block of a hospital. However, if a person obtains his general practitioner services privately, he must pay for any medications or appliances which are prescribed. A general practitioner may refer his patient for treatment in any "state" hospital in the country. If a general practitioner thinks that it is necessary, a specialist will visit the home of the patient at the State's expense. Neither the patient nor the general practitioner is given the right to choose any particular specialist for the purpose of domiciliary consultation. Boards of Governors and hospital management committees arrange for consultants in the different specialties to be available for this service.

Patients choosing to enter semi-private accommodation in hospitals will pay an amount representing a reasonable proportion of the cost involved. Those entering private accommodation will pay the whole cost of the accommodation and hospital services, together with any professional fees incurred: the latter being subject to limits set by the Minister in the case of patients occupying about 85% of the private beds. Surgical fees for these patients must not exceed 50 guineas. There is no

"ceiling" on professional fees charged to patients in about 15% of private beds.

As patients in State hospitals can be treated only by members of the hospital staff, general practitioners are almost entirely excluded from hospital practice. The only hospital beds available to them are in those "cottage hospitals" which are still staffed by general practitioners, and in those hospitals (about 200 in number in all England and Wales) which have not been taken over by the Minister. The Act provides for the erection, equipment, and maintenance of Health Centres for the use of the general practitioners and the local health authorities of the area, but I think I am correct in saying that there is not a single health centre in operation, presumably because of the impossibility of financing a building program under present conditions.

There is a special tribunal for the investigation of serious charges against a doctor, which, if proved, might mean his dismissal from the Service. Less serious complaints are dealt with, through committees, by the Local Executive Council.

The Service is financed in large part from the national exchequer, and in very small part from local rates and social security contributions. It is estimated that the cost for the current year will be about £300 million.

THE SERVICE IN OPERATION

In the eyes of the medical men of Britain, the Service has now grave deficiencies and demerits, but there is hope that in the coming years changes will be made, and many of the present imperfections removed. We have heard Dr. Dain, and other prominent English doctors, predict that in time, under the Act, the people of Britain will have the best medical service in the world. Under the old National Insurance Act, general practitioner service was provided for insured wage-earners earning less than £400 a year. Under the present Act, a full medical service is provided not only for these wage-earners but every member of their families. This is a great forward step, which was advocated by the British Medical Association as far back as 1938. Under the present Act, the hospital system is being integrated, and unnecessary duplication and waste of staff and equipment is being reduced. This also was recommended by the B.M.A., many years ago. The grouping of non-teaching hospitals under

Regional Hospital Boards has, I am informed, been productive of good. I was told that, before the Act, the standard of medical work in many of the hospitals in Britain was very low, and that Regional Boards have been doing excellent work in reorganizing and re-staffing these hospitals. Work in the first class hospitals is going on much as it did before the appointed day, although, it was admitted in most places, there has been a slight lowering in the quality of service, due to extreme overcrowding of out-patient departments and in-hospital accommodation, shortage of nurses, and delay in receiving reports from special departments. The machinery for the admission of people with acute surgical conditions seems to be working fairly well in most places, but patients may have to wait many months for orthopaedic operations, tonsillectomies, herniotomies, hæmorrhoidectomies, and so on. It is only fair to say that overcrowding of hospitals is no new thing in England, but it became aggravated when, on July 5, 1948, some 45 million people became entitled to "free" hospital and specialist services.

The administration of hospitals, as is perhaps inevitable in a great State scheme, has become complicated. Many matters which formerly could be settled in a few minutes by medical or lay administrators within the hospital, must now be referred to Regional Boards or Boards of Governors. This, as can well be imagined, is apt to lead to irritating delays, and a sense of frustration in the minds of busy medical men. Hospital finance officers are, to quote one of my informants, "sick men". Each year most detailed estimates of maintenance expenditure and income during the ensuing twelve months must be prepared, and not rarely they have to be revised before they are approved by the Minister, and there must be a meticulous accounting for all funds.

The path of the "trainee specialist" has been made smoother under the Act. He is paid from the time he becomes a House Officer, and, if he wins the approval of his seniors and passes the necessary higher examinations, he may move steadily up the ladder to a position as consultant. On the face of it, this would seem to be a good plan, but it is criticized in certain quarters. One surgeon said to me: "specialists are springing up like mushrooms in the night". Another surgeon writes in

*The Practitioner:*² "At present there are too many men of second-rate calibre encouraged to sit repeatedly for higher examinations the standard of which they are unlikely to reach". I have no comment to make on these remarks.

In my notebook I find the following statements by workers in medical schools and teaching hospitals: "Administration is most unwieldy and much too bureaucratic". "Administration is most cumbersome". "There is a bad trend: more and more administrative responsibility is being given to laymen and less and less to doctors; whereas the only way to success is good medical administration". "There is no doubt that in appointing members of Regional Boards and Boards of Governors the Government is influenced entirely by the political colour of the man". "At present we are in a jam; we are appointing a new professor of Medicine and we have no assurance that the man of our choice will be accepted by the hospital board. We can't get our professor of bacteriology appointed bacteriologist to the hospital". "The hospital is now quite distinct from the school, and we have tremendous difficulties in getting our policies implemented". "Our clinical work has not been adversely affected". "We have to do an enormous amount of committee work". "Some sort of Act was necessary for the hospitals". "More local judgment should be allowed, we could do a better job at half the price". "A lot of medical men on Regional Boards and Boards of Governors are out of touch with clinical work". All these statements were made by medical men holding high positions in the profession. One assistant-dean of a medical school, an outspoken opponent of the Service, said that already student material was deteriorating, but I found no support for this belief. There has been no falling-off in the number of applicants for admission to medical schools in London, nor has there been any reduction in the number of sons and daughters of doctors who wish to enter Medicine; this may indicate a certain optimism in the profession as to the final form of the Service.

I think that it is fair to say there is general dissatisfaction among general practitioners. With very few exceptions, those to whom I spoke agreed that they are underpaid. Some, men who, before the appointed day, were doing well in private practice, have been hard hit finan-

cially; many others have suffered some reduction in income; while those who, with three or four thousand people on their lists are making as good or better incomes than heretofore, are badly overworked. It is no rare thing for practitioners in populous areas to see sixty, eighty or one hundred patients a day. Inevitably, I think, these harassed practitioners are losing interest in scientific medicine. There is no inducement or at least no financial inducement for them to do good work. Whether their work is good or bad, whether they keep sick patients under their own care or send them to hospital, they get eighteen shillings per patient per year. It is hardly too much to say that the only instrument used by many practitioners is a fountain-pen, with which to write recommendations to hospital out-patient departments, endless prescriptions, and endless certificates. It is true that for very many years, in the densely populated areas of England, overcrowding of doctors' surgeries and "bottle doctoring" have been prevalent. The sad thing is that these evils have become aggravated under the National Health Service.

It was disturbing to hear, from a large number of medical men, that since the inception of the Service there has been a distinct deterioration in the relationship between the practitioner and the public. Many patients now adopt an unpleasant, almost a dictatorial attitude, and appear to wish to direct the doctor rather than to ask his advice.

There are practitioners—I met some of them in outlying parts of London and in surrounding villages—who are satisfied or almost satisfied with the Service. These are men who, because of local conditions, or, often, because they are rendering supplementary ophthalmic services, are making much more money than they did before the Service became operative.

Again referring to my notebook, I find the following comments by general practitioners: "Some such Act, developed slowly was absolutely necessary". "A State medical service was essential, but I don't like this one". "The relationship between the doctor and patient has suffered, we are now regarded as technicians or tradesmen". "The Act is doing us (his brother and himself) a bit of good". "Patients are more demanding but we have a good practice with little competition and we can handle them". "There is no inducement to do

any special work". "I am much better off under the Act". "People are crowding in with trivial complaints, I have had half a dozen with wasp stings this summer". "The Service is riddled with politics". "All I want is more money and health centres". "I like the Act, it is good for the country". "I have lost most of my midwifery work because I am not allowed to attend patients in the hospitals". "The greatest danger is that doctors, dissatisfied with present conditions, will demand a salaried service". "The general practitioner's surgery is becoming more and more a clearing ground for specialists". "I see more people but I do less work; the pep has gone out of practice".

One evil, the overcrowding of surgeries by people with trivial complaints, may be mitigated by the recently-announced amendment to the Act, whereby each patient presenting a prescription to a chemist must pay one shilling.

Private practice, as far as the general practitioner is concerned, is almost gone; none of the men to whom I spoke is making more than 5 or 6% of his income from private patients. However, in two places I was told that the few general practitioners who had stayed outside the Service are doing very well indeed. Apparently those people who wish to obtain medical services privately, are likely to jump the queue by selecting a practitioner who is not overbusy in the public Service. General practitioners are agreed that a considerable measure of private practice would be restored to them, if private patients were permitted to obtain drugs and appliances under the Act, on the same terms as public patients. I was informed that many of the "big" surgical and medical consultants are doing as well as ever in private practice.

It is hardly necessary to say that the British Medical Association is pressing for further amendments to the National Health Service Act. The immediate objective is to obtain a substantial addition to the central fund for the remuneration of general practitioners; and it has been proposed to the Minister that any such increment should be devoted entirely to an increase in the capitation fee for the first thousand persons on practitioners' lists.

While the very great majority of the medical men to whom I spoke are dissatisfied with the National Health Service, and are pressing

for amendments to the Act, they are determined that if the Service breaks down it will not be for lack of their co-operation. Many of them, both specialists and general practitioners, are devoting hours of their time to unremunerative administrative work. One prominent orthopaedic surgeon told me that he was sitting on seventeen committees or sub-committees; and a professor of bio-chemistry said that he thought he could beat that score.

The severest and most outspoken critics of the Service are to be found in the Fellowship for Freedom in Medicine. This Association was formed in November, 1948, and it now has some 2,000 members. Its chairman is Lord Horder, to whom Mr. Bevan once referred as an "incontinent romanticist". It was my privilege to have dinner with a number of the leaders of this group, and I heard some very angry talk indeed, about the Minister and his Act, the degradation of the medical profession under the Service, and the tragic collapse of B.M.A. resistance following relatively unimportant concessions by the Minister. I found myself out of sympathy with some of the speakers, on this occasion, and in agreement with our host, who said that the medical profession should work for amendments to the Act through the Council of the British Medical Association.

My own necessarily brief survey of the National Health Service in England, has strengthened my opinion that a State Medical Service cannot be other than ruinously costly, inefficient, and destructive of the warm personal relationship between the doctor and his patient which is conducive to good medical practice, and which is prized both by the public and by the profession.

REFERENCES

1. HILL, C. AND WOODCOCK, J.: *The National Health Service*, Christopher Johnson, London, 1949.
2. *The National Health Services Act in Great Britain: The Practitioner*, London, 1949.

Diagnostic Bronchial Lavage in Tuberculosis, Bueno, M. M.: *Diseases of the Chest*, 16: 420, 1949. Diagnostic bronchial lavage in tuberculosis consists of washing of the tracheo-bronchial passages in order to search for tubercle bacilli. In patients who do not raise or who have negative sputa, gastric washings are often used. However, the gastric lavage does not satisfy completely and other tests have been tried—laryngeal swab, search for bacilli in secretions collected through the bronchoscope or through nasal tubes. Frequently bronchial lavage is positive when gastric lavage is negative, so it is a valuable test in patients with minimal lesions.

PRELIMINARY REPORT ON ADRENOCORTICOTROPHIC HORMONE (ACTH) IN ASTHMA*

Bram Rose, M.D., J. A. P. Pare, M.D.,
K. Pump, M.D. and R. L. Stanford, M.D.

*The McGill University Clinic,
Royal Victoria Hospital, Montreal, Que.*

IN this communication we wish to report on the effects of the administration of ACTH (adrenocorticotrophic hormone)† to six patients with severe long-standing asthma. Although ACTH and cortisone have now been tried in many diverse clinical conditions following the report by Hench and Kendall on the beneficial effects of cortisone on the symptoms of rheumatoid arthritis,¹ our reasons for carrying out the present investigations are based in some measure on previous work on the relation of the adrenal gland to histamine metabolism, as well as observations on the effect of ACTH on Loeffler's syndrome, which may be summarized as follows:

The resistance of the experimental animal to anaphylactic shock as well as to the administration of histamine is markedly impaired following the removal of the adrenals.^{2, 3} Since symptoms of anaphylaxis are due in the main to a massive release of histamine at least in the guinea pig and the dog,⁴ studies on the relation of the adrenal gland to histamine metabolism were made in 1936. It was shown that adrenalectomy results in a marked increase of the histamine content of the tissues⁵ as well as a decrease in the ability of tissues to inactivate histamine either by means of histaminase,⁶ or other mechanisms.⁷ In this connection it is of interest to note that whereas restoration of these metabolic changes in the adrenalectomized animal could be achieved in part by the administration of DCA (desoxycorticosterone acetate) and salt, complete restoration to normal was attained only by the administration of adequate amounts of cortin, an adrenal cortical extract containing amongst other factors, 17 hydroxy 11 dehydro corticosterone (compound E), or as it is now called, cortisone.⁶ Another aspect of this problem was investigated in relationship to pregnancy by Rose and Harkness in 1946. It is recognized clinically that many women with

asthma become free of symptoms soon after becoming pregnant, although some fail to have a remission. Since it had been demonstrated that a marked increase in plasma histaminase occurs during pregnancy,⁸ and that histidine, a precursor of histamine appears in the urine, studies on the levels of these two substances were made. The rise in plasma histaminase as shown by the method of Ahlmark was first confirmed.⁹ It was found, however, that the plasma histaminase levels were deficient in pregnant women whose asthma persisted, or who developed toxæmia.¹⁰ It was felt that there might be a relation between the persistence of symptoms and the reduction of histaminase, thus interfering with the inactivation of histamine. At the same time the important observation that glyco-genic corticoids are markedly increased in the urine during pregnancy was reported by Venning.¹¹ By her method only steroids of a compound E nature are assayed. She noted that levels of urinary corticoids were low during toxæmia.¹² It appeared, therefore, that this was a further possible correlation between the adrenal cortex and histamine metabolism. In recent studies we have found two alterations in histamine metabolism which are pertinent to allergic states. The first is a confirmation of the fact that large amounts of histamine are excreted in the urine of asthmatics, whereas little or none is present in non-allergic patients.¹³ The second is that certain tissues of allergic man, such as antral mucosa, skin or lung, are much richer in histamine than are similar tissues from non-allergic subjects.¹⁴ For example, whereas normal human lung shows histamine values of 15 to 35 γ /gram, that from an asthmatic may be as high as 115 γ /gram.

Following the demonstration by Thorn *et al.*¹⁵ that ACTH causes a reduction in circulating eosinophiles, Herbert, de Fries and Rose in 1947 administered ACTH to a case of Loeffler's syndrome.^{16, 17} A marked reduction in eosinophiles occurred within 10 hours. The pulmonary infiltrations, however, did not disappear until several days later. Because of the tendency for spontaneous remissions to occur in this disease, the above changes could not be ascribed with certainty to the effect of the ACTH. This patient has been followed at periodic intervals since that time, and although he had frequent exacerbations prior to treatment, none have occurred since.

Because of the well known association of eosinophilia with allergic states, as well as the

* Aided by a grant from the National Research Council, Ottawa. Part of the secretarial expenses were defrayed by a grant from the Ciba Company, Montreal.

† The ACTH was generously supplied by Dr. John R. Mote of the Armour Laboratories, Chicago.

changes in histamine metabolism as outlined above, a study on the effect of ACTH in asthma was commenced in October, 1949, on which this is a preliminary report.

PATIENTS AND METHODS

Since the assessment of any therapeutic measure on asthma is difficult, the patients were carefully selected, and treatment instituted only under rigidly controlled conditions. Patients in acute status were avoided because of the well known tendency for these to clear up after several days' hospitalization and the standard methods of treatment. In the group studied, of whom six are reported here, each had been previously observed for at least three years, with asthma of a severe nature requiring daily medication. All had had severe asthma for at least eight years, with one exception where the history was of three years' duration only. One in addition to asthma suffered with marked rheumatoid arthritis, and in another there was periarteritis nodosa. In the latter, the diagnosis was established not only by a high eosinophilia and clinical manifestations of loss of weight, severe abdominal cramps and muscle pain in the legs requiring heavy sedation, but also by a muscle biopsy which showed the typical perivascular and intramuscular infiltrations of eosinophiles and lymphocytes.

The patients are hospitalized in the metabolic ward. A complete medical and allergic investigation is made. Respiratory function studies are conducted in an attempt to establish an objective base line of pulmonary function capacity. They are placed on a diet of known caloric and electrolyte values and the following studies carried out: nitrogen balance, urinary excretion of sodium, chloride, potassium, 17-ketosteroids, glyco-corticoids, histamine and histidine. Routine hæmograms and direct eosinophile counts are done. The clinical course of the patient is carefully followed and non-specific medication such as adrenalin and aminophyllin administered as required.

The first nine days constitute a period of control, on the last three days of which daily intramuscular injections of sterile water at intervals of 6 hours are administered.

On the tenth day ACTH injections are commenced and the regimen of the patient is unaltered excepting for the substitution of water by the ACTH. The preparation is injected

intramuscularly in divided doses at 6 hourly intervals. The first two patients received 150 mgm. daily for two days and then 100 mgm. for two more days making a total dose of 500 mgm. over the four days of therapy. The next four patients received 100 mgm. daily for three days, 75 mgm. daily for two days and 25 mgm. on the sixth, or last, day of treatment, making a total of 475 mgm. Following the period of treatment, the patients are kept in hospital for an additional 3 to 5 days, after which they are discharged and followed at regular intervals.

RESULTS

Within 48 hours of commencing treatment, there was a complete remission of all signs and symptoms in four patients. In the remaining two complete remission was not achieved although there was little doubt of improvement. With the need for adrenalin or other therapy removed, the pulse rate slowed down to normal and the patients experienced a sense of well being and increase of appetite. Cough and expectoration when present prior to injection of ACTH disappeared in three patients. In a fourth, the daily sputum output was around 700 to 800 c.c. and this was reduced to less than 200 c.c. by the fourth day of treatment. Respiratory function as evaluated by vital capacity and maximum breathing capacity was markedly improved. In addition the ability of histamine or mecholyl to depress respiratory function during the control period was prevented in 4 patients after ACTH. In one case, prior to treatment the inhalation of a grass extract induced severe asthma. Following ACTH this same procedure induced only mild changes in respiratory function without clinical signs.

It is too early as yet to state how long a complete remission may be expected to last. One case remained completely clear of symptoms for a period of one month, after which there was a gradual return of symptoms and the necessity to resort to adrenalin. It took approximately two weeks for the asthma to return to its previous degree of severity and this patient is now again requiring 2 or 3 injections of adrenalin daily.

In addition to these changes, alterations in nasal and antral mucous membranes were noted in that polypoid formation, thickened and hyperæmic mucous membranes were slightly re-

duced. We have not as yet observed complete regression of polyps. The immediate type of skin test reaction to foods or inhalants, which were positive in three of these patients, was not altered by the administration of ACTH.

Much of the metabolic data is as yet unavailable. However, striking alterations in urine histamine have been observed in the form of a marked to complete disappearance. In one case where complete remission was not achieved, the amount of histamine was markedly increased after ACTH. In all cases an increase of histidine occurs in the urine, the amounts of which are similar to those found during pregnancy. In four cases there was an increase of the 17-ketosteroids although this did not occur in the remaining two. The eosinophiles were sharply reduced to virtually zero within 24 hours in five cases, but were not wholly depressed until after 60 hours in the remaining case.

Associated with the disappearance of asthma, a marked improvement of the arthritis consisting in the main of a reduction in the soft tissue swelling about the involved joints, an increase in movement and a disappearance of the pain were observed in the case of rheumatoid arthritis. Similarly in the patient with periarteritis nodosa, complete remission of the asthma was coincident with a disappearance of the muscle tenderness and pain which had been so prominent a feature prior to treatment. A second biopsy taken from the deep muscle of the calf of the opposite leg on the fourth day of therapy failed to show the marked eosinophilia and lymphocytic infiltration about the arteries, and between the muscle fibres which had been characteristic of the control biopsy.

DISCUSSION

Because of the small number of patients treated and the inadequate time interval for follow-up, further investigation will be required. However, these six patients were the most severe which could be found and as such are perhaps of more value as test cases than asthmatics whose symptoms are characterized by spontaneous remissions. In four of the cases, complete cessation of all symptoms occurred for the first time in five years, at least according to their own statements.

The mechanism whereby ACTH produces a remission in asthma is not clear. It is known

that an intact adrenal cortex is essential and that ACTH stimulates the adrenal cortex to liberate adrenal corticoids. The subsequent metabolic changes which occur are probably due to the action of these compounds. Thus, administration of ACTH to a patient with Addison's disease fails to provoke any alteration of the circulating eosinophiles whereas the injection of cortisone in this condition causes a depression in these cells.¹⁵

It is possible that two alterations in the metabolism of the asthmatic following ACTH may be pertinent to elucidating the mode of action. Since the patient with asthma apparently excretes large amounts of histamine, and the tissues, primarily the lung, appear to be richer in histamine as compared to those of non-asthmatic patients, ACTH may act in part by restoring the histidine-histamine balance. It is also apparent that the sensitivity of the bronchiolar musculature to such compounds as histamine or mecholyl is decreased. Since the immediate type of skin test was not altered by ACTH, it is possible that combination of antigen with antibody may still occur, but because of the reduction in sensitivity of smooth muscle, as shown above, symptoms might not occur as a result of liberated metabolites. In this connection it should be noted that marked depression of lymphoid tissue occurs under the influence of the adrenal cortex as emphasized by Selye.¹⁸ The increase in antibody formation by the action of ACTH or cortisone as reported by Dougherty and White¹⁹ has not however been confirmed by Eisen²⁰ and his collaborators for animals nor for man by Herbert and de Fries.²¹

Selye²² has recently shown that an anaphylactoid state in the rat may be exacerbated by the administration of DCA, and prevented by cortisone or ACTH. It is of interest that this same condition may be prevented by antihistamine compounds, or exacerbated by the administration of thyroxine.²³ There is evidence as well that the prolonged administration of DCA may produce the lesions of periarteritis as well as rheumatic changes in this species.²⁴ In man, Thorn²⁵ has reported the appearance of joint stiffness and pain in cases of Addison's disease following prolonged therapy with DCA. It is, therefore, plausible that certain of the conditions such as periarteritis nodosa, or rheumatoid arthritis may be related to a deviation of

adrenal function in which excessive amounts of DCA are secreted along with insufficient of the compound E or F-like steroids. Insofar as asthma is concerned, a similar situation has not been demonstrated, although it may be possible.

Finally it must be emphasized that these investigations are being conducted primarily in an effort to study the mechanisms of hypersensitivity in man, asthma in particular. The very limited quantities of ACTH which are available make it unlikely that this preparation will be available for therapeutic use.

CONCLUSIONS

1. Of six cases of severe intractable asthma given injections of ACTH, 4 had complete remission of all symptoms, the longest of which was for one month, after which symptoms began to reappear.

2. The clinical and metabolic changes occurring prior to and during therapy are described and discussed.

3. The signs and symptoms of rheumatoid arthritis, associated in one case, and periarteritis nodosa, in another, were markedly improved.

We wish to thank Mr. J. Nowaczek for carrying out the eosinophile counts, and Mrs. E. V. Harkness and Mrs. J. Abugov for histamine determinations. We are indebted to Dr. Dorothy Bentley for permission to study the case of periarteritis nodosa. Assessment of the otolaryngological findings were made by Dr. W. J. McNally and will be reported separately. Since this paper was prepared an article by Bordley *et al.*, on "Preliminary observations on the effect of adrenocorticotrophic hormone (ACTH) in allergic diseases" has appeared in the *Bulletin of the Johns Hopkins Hospital*, 85: 396, 1949.

REFERENCES

1. HENCH, P. S., KENDALL, E. C., SLOCUMB, C. H. AND POLLEY, H. F.: *Proc. Staff Meet. Mayo Clin.*, 24: 181, 1949.
2. BANTING, F. G. AND GAIRNS, S.: *Am. J. Physiol.*, 77: 100, 1926.
3. SCOTT, W. J. M.: *J. Exper. Med.*, 47: 185, 1928.
4. CODE, C. F.: *Ann. Allergy*, 2: 457, 1944.
5. ROSE, B. AND BROWNE, J. S. L.: *Am. J. Physiol.*, 131: 589, 1941.
6. KARADY, S., ROSE, B. AND BROWNE, J. S. L.: *Am. J. Physiol.*, 130: 539, 1939.
7. ROSE, B. AND BROWNE, J. S. L.: *Am. J. Physiol.*, 124: 412, 1938.
8. AHLMARK, A.: *Acta. physiol. Scandinav.*, 9: 27, 1944.
9. ROSE, B., HARKNESS, E. V. AND FORBES, R. P.: 1946 Annual Report of the John and Mary R. Markle Foundation, p. 69.
10. *Idem*: 1947 Annual Report of the John and Mary R. Markle Foundation, p. 69.
11. VENNING, E. H.: *Endocrinology*, 39: 203, 1946.
12. *Idem*: Personal communication.
13. ROSE, B.: Unpublished results.
14. ROSE, B., ENTIN, M. AND BAXTER, H.: In publication.
15. THORN, G. W., FORSHAM, P. H., PRUNTY, F. T. G. AND HILLS, A. G.: *J. A. M. A.*, 137: 1005, 1948.
16. HERBERT, P. AND ROSE, B.: *J. Allergy*, 20: 79, 1949.
17. HERBERT, P., DE FRIES, J. A. AND ROSE, B.: In publication.
18. SELYE, H.: *Endocrinology*, 21: 169, 1937.
19. DOUGHERTY, T. F. AND WHITE, A.: *Am. J. Anat.*, 77: 81, 1945.
20. EISEN, H. N., MAYER, M. M., MOORE, D. H., TARR, R. R. AND STOERK, H. C.: *Soc. Exper. Biol. & Med. Proc.*, 65: 301, 1947.
21. HERBERT, P. H. AND DE FRIES, J. A.: *Endocrinology*, 44: 259, 1949.
22. SELYE, H.: *Canad. M. A. J.*, 61: 553, 1949.
23. LEGER, J. AND ROSE, B.: In publication.
24. SELYE, H.: *J. Clin. Endocrinol.*, 6: 117, 1946.
25. THORN, G. W., BAYLES, T. B., MASSELL, B. F., FORSHAM, P. H., HILL, S. R., SMITH, S. AND WARREN, J. E.: *New Eng. J. Med.*, 241: 529, 1949.

THE TRAINING OF A GENERAL PRACTITIONER*

Wingate M. Johnson, M.D.

Winston-Salem, N.C.

IN order to explain why an internist is presuming to discuss the training of a general practitioner, let me hasten to say that I have become an internist by a process of evolution. For ten years I was a general practitioner. Then I decided to risk starvation rather than continue to practise a branch of medicine which I disliked as much as I did obstetrics. Gradually I abandoned anaesthesia and all minor surgery (I had never done the major sort), and found my practice limited to internal medicine almost before I knew it. I continued to be a family doctor, however, until 1941, when the Bowman-Grey School of Medicine of Wake Forest College was established in Winston-Salem. Since then the most important part of my full-time job there has been helping to train young men for general practice, or family practice, as I prefer to call it.

THE TREND TO SPECIALIZATION

An old recipe for making rabbit stew began with the advice, "First catch your rabbit". On our side of the border there has been a great deal of concern over the decreasing number of young men who seek training for general practice. Some pessimistic souls have felt that the family doctor is doomed to disappear. Others, more optimistic by nature, recall that this threat to a properly balanced profession seems to be one of the evils that follow in the wake of wars. In 1866—a year after the Civil War—the relative merits of specialization and of general practice were the subject of a report by the Committee on Medical Ethics of the American Medical Association. The committee decided that the disadvantages of specialization "could be overcome if the specialist would begin as a general practitioner and gradually grow into his specialty".¹ It is interesting to note that this same idea is being revived now. In 1902—soon after the Spanish-American War—Dr. Osler told the Canadian Medical Associa-

* Read at the Eightieth Annual Meeting of the Canadian Medical Association, in General Session, Saskatoon, June 15, 1949.

From the Department of Internal Medicine, Bowman Gray School of Medicine of Wake Forest College and the North Carolina Baptist Hospital, Winston-Salem, N.C.

tion that "It is amusing to read and hear of the passing of the family physician".²

Both the world wars of this century brought about—among other evils—a great movement to specialism at the expense of general practice. After World War I this trend came to an abrupt halt soon after that fateful day in October, 1929, when the bottom dropped out of the stock market. One does not have to be a pessimist to discern multiplying signs that "disinflation" is threatening the era of pseudo-prosperity which followed World War II. A recent survey of twelve key cities in the United States, made by a reporter for the *Wall Street Journal*, indicated that doctors all over the country were experiencing a definite decline in their practice. This finding means that the family doctor will soon be coming back into his own—just as he has always done heretofore.

The education of a general practitioner naturally falls into three stages: first, medical school; second, hospital training; third—and most important—postgraduate study. Let us consider these in order.

MEDICAL SCHOOL

Undoubtedly our medical schools have had much to do with the trend to specialization. Most medical teachers are themselves specialists, and—by example possibly more than by precept—have encouraged their students to decide upon specialization rather than general practice.

To return for a moment to our recipe for rabbit stew, the best place to catch the rabbit for the stew—or the young doctor for general practice—is in the medical school. Since more than two-thirds of the last two classes graduating from the Bowman Gray School of Medicine have stated that they planned to be general practitioners, and since approximately two-thirds of our first two classes (which graduated in 1943 and 1944) are actually in general practice, we feel that our efforts to keep a proper balance between specialism and general practice must have been fairly successful. I crave your indulgence while I summarize the factors which were probably responsible for this result.³

One factor was that nearly one-half our students come from small towns or rural communities. Some years ago Dr. W. C. Davison, of the Duke University School of Medicine,

pointed out that "graduates tend to return to the environment to which they are accustomed".⁴

Another consideration is the fact that Bowman Gray is a small school, with not more than 50 in a class; and students, faculty members, and house staff are a homogeneous group. Nearly all the doctors most vitally concerned in the teaching program have their offices in the medical school building, which is under the same roof as the North Carolina Baptist Hospital—the principal teaching hospital of the Bowman Gray School of Medicine. The students apparently feel free to consult any of their teachers for advice on various problems. It is not too much to say that the student comes to look on his favorite teacher or teachers much as he would on his own family doctor; and he learns to appreciate the value of such a counsellor.

Most important is the actual teaching program. Throughout the four years emphasis is placed upon consideration of the whole man. Even in the first two years correlation courses are offered which are designed to help the students understand the application of the pre-clinical courses to the functioning of the body as a whole. In the third and fourth years, the students serve as junior interns, and are given increasing responsibility for patients in the hospital and in the outpatient department.

An important part of the teaching program is a course called "Family Practice", which occupies one hour a week and is attended by both junior and senior students. Its purpose is described by the *Bulletin* of the school: "The common problems encountered by physicians in caring for patients at home are discussed and illustrated by actual case histories. Emphasis is put not only on the diagnosis and treatment of major diseases, but on the management of minor complaints and on the physician's relationship to the patient's family and to other physicians." All through this course an effort is made to emphasize the history and the physical examination. The importance of the laboratory is recognized, and it is pointed out that technical aids can not replace clinical judgment.

The junior and senior classes are divided into four sections, and each section is given a "free" quarter, determined by lot. Many of the students are encouraged to spend this

quarter with a competent family doctor. This contact gives the student an opportunity to learn what general practice is like, and also makes his hospital service more valuable. The University of Wisconsin has been following this practice since 1927.⁵

HOSPITAL TRAINING

One great problem faced by recent graduates interested in general practice has been the difficulty of securing adequate hospital training. The "rotating internships" offered by most hospitals are for just one year, and give only brief glimpses into medicine, surgery, pædiatrics, obstetrics, and possibly a few of the specialties. As part of the trend to specialization—and possibly an important factor in it—many of the larger hospitals offer only "straight" internships and residencies. The young man who is ambitious to be a first-class family doctor is apt to be discouraged by the rather patronizing manner in which he is told that rotating internships are outmoded.

To those interested in seeing more keen, alert, ambitious young men enter general practice, it is encouraging to know that the American Medical Association's Council on Medical Education and hospitals has recently included, in a revision of the "Essentials of Approved Residencies and Fellowships," a residency specifically designed for the physician who intends to enter general practice. The *Journal of the American Medical Association* for May 14 (p. 229) comments: "A hospital seeking approval for residency training in general practice must meet the same general requirements as does a hospital offering residency training in a specialty . . . the Council recognized the demand for additional training at the graduate level by physicians who do not intend to limit their work to a specialty. . . . On the completion of a residency of this type, the physician should be better prepared to meet the professional demands of the community in his rôle as the 'family doctor'."

Even before this announcement was made, a number of larger hospitals had begun to offer training designed to prepare men for general practice. Mr. Mac F. Cahal, secretary of the American Academy of General Practice, has recently informed me that more than eighty teaching hospitals now have residencies in general practice, and that the army, navy, and air

force all are offering three-year residencies in general practice.

While there is some difference of opinion as to the type of hospital training that best suits a young man for family practice, there is general agreement that two years should be the minimum time allotted, and that at least one year should be devoted to internal medicine. The University of Minnesota divides its second year into three periods of four months each, devoted to obstetrics and gynaecology, pædiatrics, and surgery. Dr. W. C. Davison, dean of the Duke Medical School, prefers to divide the second year equally between pædiatrics and obstetrics. The Council on Medical Education and Hospitals stipulates that: "The residency . . . will provide supervised training in the major clinical divisions of internal medicine, surgery, obstetrics-gynaecology and pædiatrics, as well as in the auxiliary services of anæsthesiology, pathology and radiology". Certainly there is every reason to believe that the would-be family doctor will have increasing opportunities in hospital training, and will not need to begin his career with an inferiority complex.

POSTGRADUATE STUDY

An old story, which most of you may have heard, is worth repeating for the sake of its moral. On the campus of a small college a young man who had celebrated the occasion of his graduation by getting drunk stood on a stump, waved his diploma over his head, and shouted, "I'm educated, by gosh!"

One of the most common and most tragic mistakes made by a doctor is to assume, when he has been awarded his medical diploma, his certificate of hospital training, and his license to practice medicine, that he is a finished product, and that his student days are over. Even laymen recognize the fact that it is impossible for a doctor to be stationary in his profession; he must go either forward or backward. The late Heywood Broun once wrote: "A clergyman could sleep for 20 years and come back to his pulpit and nobody in the congregation would find him any less adequate in his job than before he went away. I think a lawyer might still get by even after so long a slumber, and I'm sure an editor could. . . . But where would a doctor be if he were ignorant of developments in his profession for even as short a time as five years?"

MEDICAL MEETINGS AND POSTGRADUATE COURSES

There are many ways in which the general practitioner—or the specialist, for that matter—may continue his training after he has finished his internship and residency. One of the most important is by attending such great medical meetings as this, which is truly a postgraduate course. Perhaps of equal, or even greater, value are the smaller local medical societies, which meet much more often. You may recall that Osler defined the medical society as “a school in which the scholars teach each other,” and added that “The society helps to keep a man ‘up to the times,’ and enables him to refurnish his mental shop with the latest wares. It keeps his mind open and receptive, and counteracts that tendency to premature senility which is apt to overtake a man who lives in a routine.”⁶

I would like to offer to the younger men in the audience one bit of advice which is based upon a long experience in attending medical meetings. That is to carry to such meetings your most important medical problems, and do not hesitate to ask help from any doctor, no matter how great his reputation. You will find that the best known men are the most easily approached, and are glad to impart any information in their power. Often one can learn more from informal discussions than from the regularly scheduled papers.

In the United States many other forms of postgraduate instruction are offered by different medical groups, such as the Chicago Medical Society, the Interstate Postgraduate Assembly, and numerous medical schools. The College of Physicians, the College of Surgeons, and many of the specialty groups have well attended meetings, and some of these offer the general practitioner much worthwhile information.

The American Academy of General Practice, formed in June, 1947, now has more than 10,000 members. Membership in this body must be renewed every three years, and a requirement for renewal is at least 150 hours devoted to postgraduate work of some kind during the three-year period. The first annual meeting of the Academy, held in Cincinnati last March, provided a stimulating and helpful program. The various meetings of the state chapters of the Academy have also been highly commended.

The habit of study.—Far more important than attendance upon medical meetings and postgraduate courses, however, is the habit of study. Every young man beginning the practice of medicine should etch upon his memory Osler's words: “The hardest conviction to get into the mind of a beginner is that the education upon which he is engaged is not a college course, not a medical course, but a life course, for which the work of a few years under teachers is but a preparation.”⁷ The habit of constant study makes the difference between an ordinary or even a good doctor and what the public calls “a real doctor”. The life of a general practitioner is a hard one, and it is often difficult for him to find time for study; but, as is often remarked, one can find time to do what he really wants to do. An excellent formula for continuing the student life after one's formal education is finished was given two and a half centuries ago by Sir Francis Bacon: “Reading maketh a full man; conference a ready man; and writing an exact man”.

Reading.—The father of William and Charles Mayo insisted that they give at least an hour a day to reading and study. As a consequence, “Neither of them ever suffered for a moment the delusion that he had finished his education and had no more to learn”. W. J. Mayo kept scrupulous account of his reading time, and made up for any unavoidable debit.⁸

It is obviously impossible to read more than a tiny fraction of all medical literature, and fortunately one can keep fairly well informed by perusing regularly a few well selected journals. Much time can be saved by the habit of reading the summary and conclusions first, since these often contain the gist of the article. As for books, we may again turn for advice to Bacon: “Some books are to be tasted, others to be swallowed, and some few to be chewed and digested.” A few medical books are worthy of being chewed and digested, but most of them are to be tasted or swallowed piecemeal as they are needed for reference.

While it is important to keep up with medical literature, there are two reasons why a doctor should not confine his reading to medical subjects alone. One is that the physician is by tradition a cultured, educated gentleman. The second is that the best writers are apt to be also the best observers, and much may be learned from general reading. A habit which

I can, from experience, commend it to devote the last half hour or more of the day to reading something quite foreign to medicine. Thus diverting one's thoughts from their daily routine helps to insure a good night's rest.

Even such a good thing as reading may be overdone. Let me quote from Osler again: "Divide your attentions equally between books and men. . . . To study the phenomena of disease without books is to sail an uncharted sea, while to study books without patients is not to go to sea at all."⁹ A rather pathetic character is the "bookish" doctor, who never seems to learn how to apply what he reads to everyday clinical problems. The few patients who consult him are apt to have the expense of innumerable unnecessary laboratory procedures, and to be subjected to gruelling examinations for trivial ailments. All too frequently such a doctor is unable to add up all his data so as to get the right answer.

The best doctor is the one whose judgment is based upon fairly equal parts of observation, study, and common sense. Such a doctor has wisdom, rather than mere knowledge.

Knowledge and wisdom, far from being one,
Have oft-times no connexion. Knowledge dwells
In heads replete with thoughts of other men;
Wisdom in minds attentive to their own.
Knowledge is proud that he has learned so much;
Wisdom is humble that he knows no more.

—COWPER

Conference. — The second ingredient of Bacon's formula may be obtained in various ways, some of which have already been mentioned: by attending medical meetings, post-graduate courses, and staff conferences, and by talking over puzzling cases with one's colleagues, whether such consultations be formal or of the curbstone variety. It is one of the glories of our profession that its members have no trade secrets, but are glad to impart any information they can to one another. I recall vividly the early days of my practice, when my senior colleagues so generously and graciously shared the fruits of their experience with me. Now I find that I am depending almost as much upon my junior colleagues to keep me informed about the newer laboratory methods, the latest discoveries in vitamins and antibiotics, and the constantly changing nomenclature for pathogenic organisms. I hope that they are finding some of my clinical experience a fair exchange.

Writing.—Ten years of editing contributions to our state medical journal have made me somewhat skeptical of Bacon's observation that writing makes an exact man. Only too many papers show evidence of having been thrown together, with little regard for grammar, syntax, organization, or accuracy. Many obviously have not been given a second reading by the author after they have been typed, and these reflect faithfully the secretary's original ideas of spelling and punctuation. A few physicians, however, are mindful of Robert Louis Stevenson's dictum that "Easy writing makes hard reading, hard writing makes easy reading". The papers they write help to make them exact men, and afford the editor some compensation for a rather tedious job. Certainly it is true that the man who writes a paper on a medical subject will learn more from it than he can hope to teach those who read it. As a rule, the most valuable papers are those giving the author's own experience—especially when he has an original observation to present.

Keeping case records is often burdensome, but it too makes for exactness. It does not take long to jot down the salient points in a patient's history and physical examination, and the practice pays dividends in many ways. Such a record is of great value when the patient returns weeks, months, or years later, and has even greater value in case of legal action. One can never tell—in the United States, at least—when an apparently trivial injury or illness may serve as the basis for a damage suit. Even the most conscientious physician may be the victim of a suit for malpractice, and his records may then save him considerable mental anguish, if nothing more.

Records may be used in preparing medical papers—either case reports or statistical studies. The habit of keeping in mind for special study some problem, or even several problems, adds immeasurably to the zest of practice. It gives the spice of adventure to what may otherwise become monotonous routine. Furthermore, this habit was responsible for the monumental contributions made to medical progress by such general practitioners as Hippocrates, Withering, Jenner, Crawford Long, Marion Sims, and Sir James Mackenzie.

The ideal for which we all should strive is to maintain the proper balance between books and men; between the psychic and the somatic;

between the practical and the visionary; between the essential and the non-essential. As Oliver Wendell Holmes said, "A just balance of mental power is a great deal more likely to be useful than any single talent . . . in excess".¹⁰

CONCLUSION

Before giving a final quotation from Osler, let me assure you that I have borrowed so freely from this great physician through force of habit, not because I was trying to impress a Canadian audience. I can not think of a more beautiful or impressive summary of the message I have tried to bring than the concluding paragraph of his farewell address to American and Canadian medical students: "In the student spirit you can best fulfil the high mission of our noble calling—in his *humility*, conscious of weakness, while seeking strength; in his *confidence*, knowing the power, while recognizing the limitations of his art; in his *pride* in the glorious heritage from which the greatest gifts to man have been derived; and in his sure and certain hope that the future holds for us still richer blessings than the past".⁷

REFERENCES

1. FISHBEIN, M.: A History of the American Medical Association 1847-1947, W. B. Saunders Co., Philadelphia, 2nd ed., p. 74, 1947.
2. OSLER, W.: Chauvinism in Medicine, in *Æquanimitas with Other Addresses*, P. Blakiston's Son & Co., Philadelphia, 2nd ed., 1930.
3. JOHNSON, W. M.: Preparing the Medical Student for Family Practice, Papers and Discussions Presented at the Annual Conference on Medical Education and Licensure, American Medical Association, Chicago, 1948.
4. DAVISON, W. C.: *J. Am. M. Ass.*, 115: 2227, 1940.
5. CAREY, H. L. AND ANDREWS, C. B.: *California Med.*, 70: 262, 1949.
6. OSLER, W.: On the Educational Value of the Medical Society, in *Æquanimitas with Other Addresses*, Blakiston, Philadelphia, 2nd ed., 1930.
7. OSLER, W.: The Student Life, in *Æquanimitas with Other Addresses*, Blakiston, Philadelphia, 2nd ed., 1930.
8. CLAPESATTLE, H.: *The Doctors Mayo*, University of Minnesota Press, Rochester, 1941.
9. OSLER, W.: Of Books and Men, in *Æquanimitas with Other Addresses*, Blakiston, Philadelphia, 2nd ed., 1930.
10. HOLMES, O. W.: The Young Practitioner, in *Medical Essays*, Houghton, Mifflin & Co., Boston, 1911.

RÉSUMÉ

Il s'agit d'un article écrit par un médecin qui faisait autrefois de la pratique générale mais qui se livra exclusivement dans la suite à la pratique de la médecine interne. L'auteur constate que le médecin de famille a eu son ère de prospérité peu de temps après la première guerre et que probablement une ère semblable se prépare. Il passe en revue l'éducation nécessaire pour ce genre de pratique et en fait une étude détaillée. Dès l'université les étudiants font un stage comme interne junior en 3e et 4e année. Ils sont encouragés à passer quelque temps avec un médecin de famille compétent. Puis vient l'entraînement proprement dit dans un milieu hospitalier. Ici la rotation dans les différents services

est considérée comme essentielle. Et finalement ce sont les études post-scolaires, car un médecin ne peut se permettre de cesser d'étudier. L'auteur insiste sur quatre points: (1) L'habitude d'étudier. (2) La lecture, non seulement de sujets scientifiques mais aussi de sujets éloignés de la médecine; le médecin doit être universel. (3) Les conférences, qui comprennent avant tout les réunions à l'hôpital les réunions médicales, les congrès. (4) La rédaction d'articles et une tenue soignée des dossiers de patients. YVES PRÉVOST

CARCINOMA OF THE BREAST*

R. M. Janes, M.D.

Toronto, Ont.

IN the short time at my disposal I should like to present a relatively simple approach to the problem of cancer of the breast and the conditions which must be considered in any discussion of the subject. The opinions which I shall express with regard to treatment have been reached after many years of association with the follow-up clinic for breast cancer at the Ontario Institute of Radiotherapy, Toronto, directed until his recent death by the late Dr. Gordon Richards.

Perhaps in no other organ or tissue have the problems of the student and practitioner been rendered so difficult by the application of a multiplicity of names. There is no justification for retention of the great majority of these or for continuing to teach them to the student. Some twenty terms have been applied to fibroadenoma of the breast because of the various changes that may occur in them. An equal number of names have been used to describe the various manifestations of lobular hyperplasia or chronic mastitis. Many descriptive terms have been applied to cancer, only a few of which are of real value. All this merely confuses the clinician and results in a halting and uncertain approach to the diagnosis and management of the diseases that affect this structure. I should like to refer briefly to those conditions that are likely to present some difficulty in the diagnosis of breast cancer. In actual practice they are not numerous.

Inflammatory.—The low grade pyogenic infection usually staphylococci in origin may form a deeply situated encysted mass in the breast without any of the usual signs of inflam-

* Read before the Eightieth Annual Meeting of the Canadian Medical Association, General Session, Saskatoon, June 16, 1949.

mation. The diagnosis may become apparent only when pus has been aspirated or an exploratory incision carried out. If œdema of the surrounding breast tissue and the overlying skin be present with some redness and local heat, the picture may be indistinguishable, even to the experienced observer, from inflammatory carcinoma. A mistake may lead to neglect of a carcinoma or to an inadvisable incision into it.

Tuberculosis of the breast may lead to the formation of a single nodule (a tuberculoma), a diffuse infiltration with œdema of the overlying skin and perhaps some local redness and heat, or to sinus formation. The tuberculoma may be quite indistinguishable from a scirrhous carcinoma until an exploration has been carried out, the diffuse change may mimic an inflammatory cancer and the sinus formation may be mistaken for a complication of a pyogenic infection. Strangely enough there is often no recognizable pulmonary lesion.

Trauma.—Localized trauma to the breast may lead to fat necrosis. If there is a definite history of trauma, especially if local discoloration is remembered by the patient, this condition should be suspected. Unfortunately injury to the breast is so common that little attention can be paid to an indefinite history particularly since patients are apt to try to explain any lesion on this basis. Fat necrosis leads to the formation of a firm nodule fixed in the breast tissue, often adherent to and fixing the overlying skin, which may be regarded as typical of a scirrhous cancer. A biopsy is necessary to make a definite diagnosis.

Benign tumours.—The only benign tumours that occur frequently enough to warrant consideration are the fibroadenomas, duct papillomas and lipomas. Lipomas may arise at any depth and give rise to soft fluctuant masses which are usually not difficult to diagnose. The adenomas appear most often in the late second and early third decade and because of their characteristics are as a rule not difficult to recognize. Occasionally they are multiple. They may occur near the menopausal period or as a complication of chronic mastitis in which case differentiation from a single cyst or carcinoma may be more difficult. They are occasionally very large and such giant fibroadenomas are not infrequently bilateral. They may undergo cystic degeneration giving rise to tumours of varying consistency. Rapid growth of an adenoma may

occur during pregnancy, and in the absence of a history of a pre-existing lump lead to a diagnosis of carcinoma. Because no lump the nature of which is unproved should be left in a breast, because of their tendency to enlarge, particularly during pregnancy, and because in some instances they undergo malignant change, all fibroadenomas should be removed when diagnosed. Duct papillomas are most frequently associated with chronic mastitis. They do occur, however, as single lesions that lead to a discharge from the nipple often bloody or to a nodule beneath the areola. They should in every case be removed because only in that way can the diagnosis be proved and because they may undergo malignant degeneration.

Chronic mastitis (nodular hyperplasia).—This condition received the name of chronic mastitis when it was believed to be infective in origin. The term nodular hyperplasia employed by Boyd is preferable, but the older and somewhat classic term is unlikely to be displaced. The disease is probably hormonal in origin and related as suggested by Keynes to the cyclic changes in the breast that accompany menstruation. The many terms that have been attached to various microscopic pictures observed by pathologists are unnecessary. If it is thought of as a proliferative condition which affects the epithelial and fibrous supporting tissues of the breast in varying degrees, the different appearances observed under the microscope in different specimens and indeed in the same specimen are readily understood. On the one extreme is the lesion in which there is great increase in fibrous stroma so that epithelial structure is scant and on the other the lesion in which the epithelial proliferation overshadows the fibrous tissue changes. In between are many gradations. The changes may affect the whole breast although usually in different degrees and tends to be lobular in distribution. It usually involves both breasts. Much difference of opinion has existed and indeed still exists regarding the relation between this disease and cancer. If regarded from a purely pathological point of view it would seem reasonable to suppose that these proliferative changes might be a precursor of malignancy. Clinical studies have cast doubt upon this relationship. I have believed for many years that there was little if any relation between nodular hyperplasia and cancer of the breast, and increasing experience has tended to

confirm this point of view. The problem that faces the clinician is not, might this become malignant, but is it malignant now? Only when there are marked proliferative changes in the epithelium is removal of the breast justifiable.

Cancer of the breast is best approached by the clinician on a somewhat similar basis. When there is much stroma in relation to malignant epithelial structure a scirrhus cancer is produced; when stroma is scanty and epithelial structure proportionally great the medullary type is produced. In between again are many gradations. Generally speaking the more cellular the cancer the more rapid is the growth and the greater the tendency to early dissemination although it should be remembered that even the small scirrhus growth may give rise to early metastases. The cancer in the pregnant or lactating breast is nearly always of the medullary type. The so-called inflammatory cancer is medullary in type, the inflammatory changes representing the great vascularity and the reaction in the tissues of the host to the rapidly growing tumour. The duct carcinoma probably warrants special recognition and Paget's disease is a separate entity.

SYMPTOMS

I should like now to approach the problem from the view of symptomatology. Patients consult the doctor as a rule because of pain, the presence of a lump or a discharge from the nipple. In something like 90% of cases, the chief complaint in nodular hyperplasia is pain of a "tooth-achey" type; the proportion is reversed in cancer.

Any discharge from the nipple may be a serious omen but blood always warrants attention. Bloody discharge from a duct of the nipple arises most frequently from a duct papilloma, occasionally single but usually the papillary overgrowth of ductal epithelium that is part of a lobular hyperplasia. It may, however, arise in a duct carcinoma. Contrary to the statement of the older text books it is a symptom of a benign lesion in over 90% of cases. The presence of cancer must always be excluded. If a nodule can be palpated in the region of the areola pressure upon which produces blood from the nipple, the problem is simple and merely that of exploration and biopsy of a tumour. More frequently no nodule can be felt but in such instances it is nearly always possible to find a point pressure upon

which results in extrusion of blood from the nipple. If blood is produced by pressure at several places the source of bleeding is likely to be a diffuse hyperplasia with multiple papillary formations. Bleeding points always should be explored under general anaesthesia and if a papilloma is found malignancy should be excluded by a quick section. Removal of the papilloma is as a rule all that is necessary or when there is obvious involvement of one or two lobules resection of the involved segment may be carried out. Consent for removal of the breast should be obtained before operating on such a patient. A conservative approach is particularly important in young women.

TABLE I.

CLASSIFICATION PRIMARY CARCINOMA BREAST (STEINDTHAL)

Group or Stage I.

Growth limited to the breast, no fixation to skin or underlying tissue and axillary lymphatic glands not involved (clinically) not palpable or microscopically negative, if biopsy taken.

Group or Stage II.

Tumour adherent to skin, retraction of nipple, *Axillary glands invaded* (clinically palpable or histologically positive).

Group or Stage III.

Further invasion, e.g., of other glands (e.g., supra-clavicular) other breast, pectoral muscles, ulceration of skin, distant metastases, adherence of tumour to deep tissues.

Patients in whom the skin is ulcerated or about to ulcerate, *but* in whom there are no *palpable glands* in the axilla or elsewhere, should be entered as stage III and "skin" entered against the plus sign. This of course does not include patients in whom there is only *attachment* of the skin to the tumour.

When the presenting symptom is pain or tenderness, and no single or definite lump can be palpated surgical interference is rarely necessary. Generally speaking the necessity for operation on such cases varies inversely with the experience of the doctor. It must be an invariable rule, however, that no lump the nature of which is unproved should be allowed to remain in a breast. The absence of enlargement of the regional lymph nodes should not be accepted as evidence against malignancy. If the examination suggests that the nodule may be a cyst, a small needle (20 to 24 gauge) should be inserted under local anaesthesia. If clear or opalescent fluid is obtained, and the mass disappears the patient should be asked to return for observation in six weeks' time. If on the other hand, bloody aspirate is ob-

tained, the condition is probably a papilloma or a duct carcinoma protruding into a cyst and surgical exploration should be advised forthwith. Also on the re-check examination if any suspicion of a lump remains, the patient should be operated on. Following these rules I have never had cause to regret this method of dealing with cystic lesions, and much needless surgery has been avoided. It is surprising how seldom a particular cyst refills. If careful records are kept, it is usually found that if the patient returns with a cyst it is in another position and would not have been prevented by excision of the original.

The remaining problem is that of the accidentally discovered lump. Here the probability of malignancy is always strong. Time will not permit a review of the picture most frequently presented by carcinoma, and indeed it would be unnecessary. I would merely reiterate that nearly all of the classical findings save one, the presence of a lump, may be absent and that no lump should be left undisturbed or kept long under observation, the exact nature of which has not been proved. The ideal approach to such a lump is without doubt under general anaesthesia, with full preparation for a radical mastectomy, and with the services of a pathologist skilled in quick section work available. My personal preference is for a direct incision into the mass, as I believe it is less likely to disseminate cancer cells than excision of the lump which must result in cutting through lymphatics containing actively growing cancer cells, and through blood vessels with much more bleeding. The incision into the mass traverses in most of its extent the less actively growing portion of the cancer. The surgeon possessed of an adequate knowledge of breast pathology will have no difficulty in making a diagnosis from the gross appearance in nearly all instances at this stage.

There remains, however, a small percentage in which no one can be certain, and it is in these that the help of the pathologist is most appreciated. If the lesion is regarded as benign, it should always be removed completely for subsequent paraffin section examination lest the piece removed for biopsy was not well chosen or the interpretation of the frozen section incorrect. If the services of a pathologist are not available and there is doubt as to

whether the condition is malignant, a mastectomy should not be done until the pathological report on the excised lump can be obtained. It is true that a delay of even forty-eight hours may not be desirable in such cases but the influence on the prognosis if the mastectomy is carried out within two or three days does not seem to be great, and radical mastectomy for a benign lesion is a most distressing error. Paget's disease is a form of cancer in which the diagnosis should be made early but in fact it is often made very late. No scaly or eczematous condition of the nipple, certainly in the absence of similar skin lesions elsewhere, should be kept under observation on bland ointments, mild doses of x-ray, etc., for more than a few weeks. In actual fact, if one excludes those cases in which the changes in the nipple are secondary to discharge from ducts in the nipple rather than changes in the nipple itself, few conditions remain that can be confused justifiably with Paget's disease.

I have not considered the various sarcomas that may occur since they are relatively uncommon. One should remember, however, that any form of sarcoma including the osteogenic may be found in the breast.

TREATMENT

Unfortunately there is still no uniformity of opinion regarding the treatment of cancer of the breast. At the one extreme are the surgeons who will give no place to radiotherapy, at the other the radiotherapists who feel that this form of therapy should replace surgery entirely. It is very difficult to compare statistics, since, in the first place so many different classifications are used, and in the second, given a standard classification there would still be variation in the listing of individual cases. There is a tendency to assess results solely on the basis of survival statistics. This fails to take into account comfort and happiness during the period of survival, the degree of discomfort associated with the treatment, etc. The treatment which I shall outline must, therefore, although based upon a quite extensive experience, be regarded as a group opinion since others with similar opportunities will differ. I have no doubt that differences of opinion are dependent to some extent upon the relative efficiency of surgery and radiotherapy in particular areas.

TABLE II.
CLASSIFICATION PRIMARY CARCINOMA BREAST
(PORTMANN)

Group or Stage I.
Skin—not involved.
Tumour—localized in breast and movable.
Metastases—none in axillary lymph nodes or elsewhere.
Group or Stage II.
Skin—not involved.
Tumour—localized in breast and movable.
Metastases—few axillary lymph nodes involved (clinical enlargement must be definite); no other metastases.
Group or Stage III.
Skin—œdematous, brawny red induration and inflammation not obviously due to infection; extensive ulceration; or multiple secondary nodules.
Tumour—diffusely infiltrating breast; fixation of tumour or breast to chest wall; œdema of breast.
Metastases—many axillary lymph nodes involved or fixed; no clinical or roentgenological evidences of distant metastases.
Group or Stage IV.
Skin—as in any other group or stage.
Tumour—as in any other group or stage.
Metastases—axillary lymph nodes and supraclavicular lymph nodes extensively involved and clinical or roentgenological evidences of more distant metastases.

TABLE III.
MAMMARY CARCINOMA, MODIFICATION OF PORTMANN'S
CLASSIFICATION
(AS USED SINCE JULY, 1947)

Stage I.
Skin—not involved.
Tumour—localized in breast, movable, less than 3 cm. in diameter.
Metastases—none in axillary lymph nodes or elsewhere.
Stage II.
Skin—not involved.
Tumour—localized in breast, movable, less than 6 cm. in diameter.
Metastases—few axillary lymph nodes involved; no other metastases.
Stage III.
Skin—attached, fixed but not obviously invaded; nipple retraction.
Tumour—localized in breast; 6 cm. in diameter; (may be attached to fascia but not fixed to chest wall).
Metastases—may or may not be involvement of a few axillary lymph nodes.
Stage IV.
Skin—œdema or induration, or ulceration or local skin nodules or acute inflammation.
Tumour—diffuse infiltration or fixation to chest wall or œdema of breast.
Metastases—axillary lymph nodes extensively involved or fixed; no clinical or roentgenological evidences of distant metastases.
Stage V.
Skin—as in any preceding stage or with nodules beyond the periphery of the breast.
Tumour—as in any other group or stage.
Metastases—extensive invasion of axillary lymph node or supraclavicular lymph node involvement or clinical or roentgenological evidences of distant metastases.

Some years ago we abandoned the Steindthal classification as unsatisfactory, and adopted a slight modification of Portmann's. This has on the whole been satisfactory, but as a result of a survey made about two years ago it was decided to use for the time being at least, a five stage classification. This has been done in order that we might sort out of Portmann's stage two those cases that were so classified because of the extent of the local disease, and those that fell into the group because of nodal involvement. The follow-up suggested that too many skin metastases were occurring in the former group when surgery and postoperative radiation were used.

At the present time we are recommending radical mastectomy in Stage I with or without postoperative radiation, radical mastectomy with postoperative radiation (in Stage II), preoperative radiation followed usually by radical mastectomy in Stages III and IV and radiation only in Stage V. It must be admitted that a good many variations creep in. A simple mastectomy might be recommended for a very old woman with a Stage I lesion, or to rid her of an advanced lesion since surgery is less disturbing than radiotherapy. Generally speaking we regard advanced age as an indication for surgery rather than radiotherapy since in the hands of skilled teams even radical mastectomy should carry very little danger and as well as being less disturbing, relieves the patient so much sooner. Simple mastectomy may be justifiable occasionally even in Stage V cases to rid the patient of a mass which is ulcerating or about to ulcerate even though the prognosis is hopeless. It is felt that radical mastectomy should follow preoperative radiation since it has been possible to sterilize lymph nodes in the axilla known to have been invaded in less than 20% of cases. Axillary recurrences following an adequate radical mastectomy are very uncommon. We do not think that radical mastectomy if done by sharp dissection and from the most proximal limits of the field distally disseminates the disease, indeed a lessened tendency to dissemination may be one of the important effects of radiation. The use of radiation either preoperatively or postoperatively should never be an indication for anything less than the most meticulous radical operation.

If preoperative radiation is undertaken, it should be carried to a therapeutic dose level and usually to the maximum of skin tolerance. Surgery should be postponed until the skin has recovered from the effects of radiation, usually a period of six to eight weeks following the last treatment and if necessary longer. A reasonable increase in this period does not seem to influence prognosis. Healing is almost as satisfactory as in non-radiated cases providing the skin is never closed with tension, and infection is avoided. The blood supply of radiated skin is adequate if it is not placed on tension, but such skin is quite inelastic. If there is any doubt an immediate Thiersch graft should be done to close the defect on the chest wall. Such grafts almost invariably take well. Because radiated tissues resist infection poorly, it is wise to give all such patients penicillin for a few days before and up to one week after operation. The technical difficulties of the dissection are increased at times but not sufficiently to present real difficulty.

It has not been thought wise to extend radical mastectomy to those cases with involvement of the supra-clavicular nodes. If an adequate follow-up is maintained so that enlargement of these nodes is recognized early, they can be kept under control by radiation in most instances until the patient succumbs to remote metastases.

We have not been able to convince ourselves that castration either by radiotherapy or surgery is justifiable as a routine. Temporary regression of pulmonary metastases has been observed. Hormone therapy has been used to an increasing degree in the last few years. Testosterone is useful in the management of certain advanced cases, particularly those in whom the areas of involvement are too numerous for radiotherapy or are resistant to radiation, or in the presence of pulmonary or liver metastases that cannot be treated otherwise. Considerable relief of pain, improved well-being, and some prolongation of life may be expected in some cases.

Bone metastases should be recognized early, through maintenance of a follow-up. X-rays of bones should be obtained as soon as symptoms suggest that they may be involved. If symptoms are suggestive, appropriate areas should be radiated even in the absence of positive x-ray findings. If this is done, pain will be

relieved in a high proportion and fractures will be prevented in the majority.

The responsibility borne by the family physician in this as in so many other conditions is a grave one. He is the first to see the patient. Although cancer of the breast is one of the most common the experience of the individual practitioner can never be great. That should mean that final responsibility will not be accepted for any doubtful lesion. It is comforting to say to oneself that the lump one saw before was chronic mastitis but it is very rarely true. Finally there is a great difference in results obtained by surgeons skilled in surgery of the breast and those obtained by the man who does an occasional mastectomy. No one should undertake radical mastectomy unless competent and willing to do it as thoroughly as possible. The same must be said regarding radiotherapy which I am certain varies as much in its efficiency as does surgery. These are the ways in which we as doctors can improve the results of treatment of cancer of the breast. In spite of all our efforts many patients will not report early but when they have reported the responsibility is ours.

Effect of Adrenalectomy on Eosinophil Response of Rats Infected with *Trichinella spiralis*, Larsh, J. E. and Nichols, J., *Proc. Soc. Exper. Biol. & Med.*, 71: 652, 1949. Recently there have appeared reports that adrenal hormones depress the number of circulating eosinophils. Injection of adrenal cortical hormone will cause a lowering of the number of circulating eosinophils, or injection of adrenotrophic hormone from the pituitary will accomplish the same result if the adrenal gland is intact. In fact, this lowering of the eosinophils taken together with other changes in the body chemistry is proposed as a test for adrenal cortical insufficiency. Presumably the presence of the adrenal cortex has an inhibitory influence on the eosinophil-producing bone marrow. The eosinophil response to infection with *trichinella spiralis* usually is striking in humans and has been reported high for rats and mice. This suggested that the eosinophil response in intact and adrenalectomized animals infected with this parasite would yield interesting results. Higher eosinophil levels were found in the infected and adrenalectomized rats than in the adrenalectomized only or infected only animals, but the difference was too slight to draw definite conclusions so it was planned to repeat the experiment with an animal with a higher granulocyte count than the rat.

THIOCYANATE THERAPY*

W. Ford Connell, M.D.,† G. K. Wharton, M.D.‡
and
C. E. Robinson, M.D.§

Kingston, Ont.

DURING the past twenty years, over three score papers have been published on various aspects of thiocyanate therapy—its efficacy, or otherwise, and its possible toxic effects. Only three of these^{1, 2} have discussed the selection of patients for therapy, while none have approached a systematic method of administration. This paper reports our experience with this drug, special attention being paid to these two aspects.

Administration.—Until Barker⁴ showed that the concentration of the thiocyanate radicle in the serum could be determined by a simple chemical procedure, this drug had been given

termine the "maintenance dose" which will maintain this level, without dangerous cumulation.

We decided to see if a system of "loading" could be devised, similar to that utilized with rapid digitalization methods, so that the therapeutic level would be arrived at in a matter of hours rather than of days, treatment thereby being rendered more efficient, with the stay of the patient in hospital materially shortened.

Our first problem was to calculate the dosages required. Earlier, it had been shown by Lavietes *et al.*⁵ that the thiocyanate radicle was evenly distributed in the extracellular fluid of the body. This is usually considered to represent, depending on body weight and constitution, between 15 and 20% of the total body weight, although Page⁶ states that it may be as much as 30%. A formula for calculating dosage has been suggested by Blaney, Geiger and Ernst,⁷ as follows:

1. Weight of the patient $\times 0.2$ = volume of extracellular fluid through which thiocyanate is to be distributed.
2. Volume of E.C.F. in kgm. $\times 10 \times$ desired conc. of SCN (stated in mgm. %) = desired total dose of SCN in mgm.
3. SCN dose $\times 97$ = total dosage of potassium thiocyanate (in mgm.).

58

1 and 2 may be combined, thus:

$\frac{\text{Weight of patient (in lb.)} \times 0.2 \times 10 \times \text{desired level (in mgm.)}}{2.2}$

and condensed to: weight of patient in lb. $\times 0.9$ (constant) \times desired level (in mgm) = mgm. of KSCN required to "cyanate" the patient.

more or less by rule of thumb. With no safe guide to dosage, many toxic reactions naturally occurred, and one finds nine fatal poisonings reported in the literature prior to 1936. With the introduction of the photoelectric colorimeter, it has become a simple procedure to check serum levels regularly, and to maintain an optimum concentration. This has been stated by Barker, and confirmed by the experience of others as well as ourselves, to be between 8 and 14 mgm. % of the SCN radicle.

Obviously, when a decision has been made to assess the effect of this drug in a given patient, the therapeutic goal is to administer the drug in a cumulative fashion so as to achieve the desired serum level as smoothly, quickly and accurately as possible and thereafter to de-

We decided to use this formula to calculate the amount of the drug needed to establish desirable serum levels, and developed two oral methods of "loading": (a) massive—giving the patient, the total "loading dose" in three equal amounts, within a period of 24 hours; (b) spaced-spreading approximately the same total dose over a period of three days, two doses being given each day. These decisions were purely arbitrary.*

Subject material and procedure.—The subject material of our study comprises 140 persons: 50 outpatients from the Hypertension Clinic, and 30 in-patients from the Kingston General Hospital, 10 healthy interns and 50 under-graduate medical students from Queen's University.

The observations were carried out for varying periods. The students and interns, on whom the loading, maintenance and excretion studies were largely performed, were followed for from one to three weeks. The group of patients under therapy for hypertension have been studied in some cases for as long as 18 to 36 months. The majority have been followed for less than a year.

Chemical estimation of serum potassium thiocyanate was performed as follows: To 1 ml. serum is added

* From the Department of Medicine, Queen's University, and the Kingston General Hospital, Kingston, Ontario.

† Professor of Medicine.

‡ Professor of Clinical Medicine; now Professor of Gastroenterology, University of Southern California, Los Angeles.

§ Research Fellow in Medicine.

* We are indebted to Eli Lilly and Co. for the generous provision of enteric coated Enseals containing 200 mgm. or 3 grains of potassium thiocyanate, and identical placebos used in another part of this investigation.

4 ml. distilled water and 5 ml. trichloroacetic acid. After agitation, the mixture stands for 10 minutes and is then filtered. To 5 ml. of filtrate is added 1 ml. of ferric nitrate reagent. This solution is then shaken and read in a Leitz photo-electric colorimeter, using filter of wavelength 440 m μ . The readings are compared with a calibrated scale prepared from standardized amounts of known thiocyanate radicle.

Loading experiment.—Our first loading experiment with the drug was undertaken with four chronically ill but ambulatory patients. We attempted to bring these cautiously to a low serum level of 8 mgm. % by administration of the entire calculated amount in a single dose. The concentrations obtained were much lower than expected (35 to 70% of the calculated level). We felt that abnormal water balance might be a factor here, and hence included a group of healthy interns in our subjects for loading experiments. Levels were still quite low, and it became apparent that the degree (and

incompleteness) of intestinal absorption was an important factor in our discordant results. To overcome this factor, and to establish, if possible, the validity of our formula, it was decided to administer the drug intravenously, using a 5% aqueous solution of sodium thiocyanate of our own preparation, dosed according to the above formula. (The sodium salt was selected because it is the predominant ion of extracellular fluid and because potassium salts cause considerable irritation of the vein wall, leading to sclerosis.)

Six loading experiments, with an attempted result of 5 mgm. %, were carried out, blood samples being taken 2 and 4 hours after parenteral administration of the drug. The highest levels obtained were 3.2 mgm. %, or about 66% of that desired. The formula was then arbitrarily revised, thus, $5/3.2 \times 0.9$ (the former constant) which gave us a new constant of 1.4.

TABLE I.
URINARY EXCRETION OF KSCN

Subject		B.B.			A.M.			J.W.		
Day	Volume (c.c.)	Concentration of KSCN (mgm. %)	Excretion of KSCN (mgm.)	Volume (c.c.)	Concentration of KSCN (mgm. %)	Excretion of KSCN (mgm.)	Volume (c.c.)	Concentration of KSCN (mgm. %)	Excretion of KSCN (mgm.)	
1	1480	14.8	219.0	1350	18.7	252.5	980	18.7	183.3	
2	2050	14.1	289.1	1600	16.7	267.2	900	17.1	153.9	
3	1050	17.8	186.9	1230	16.0	196.8	620	19.7	122.1	
4	1970	19.3	380.2	1540	21.4	329.6	1190	17.8	211.8	
5	1040	16.7	173.7	1290	24.8	318.9	1110	20.7	229.8	
6	1530	27.5	410.9	1190	22.1	263.0	940	14.8	129.1	
7	1680	27.2	456.9	1350	16.7	222.5	830	17.1	141.9	
Total excreted			2116.7	1850.5			1171.9			
Total ingested			2800.0	2800.0			2800.0			
Recovery			75.6%	66.1%			41.8%			

*It is noted that some of the drug unaccounted for is explained by the changed concentration of the extracellular fluid of the subjects. For example, B.B.'s serum level rose from 3.3 to 10.5 mgm. %. Using a 20% fraction of body weight as the extracellular compartment, this would explain the presence of $\frac{20}{100} \times 135 \times 7.2$ or 194.4 mgm., almost 7% of the amount ingested. On the other hand, the serum levels of A.M. and J.W. decreased. Other avenues of excretion not established quantitatively were faeces and perspiration.

TABLE II.
URINARY EXCRETION OF NaSCN, 5%

Subject		A.M.		J.W.			D.W.		
Day	Volume (c.c.)	Concentration of NaSCN (mgm. %)	Excretion of NaSCN (mgm. %)	Volume (c.c.)	Concentration of NaSCN (mgm. %)	Excretion of NaSCN (mgm. %)	Volume (c.c.)	Concentration of NaSCN (mgm. %)	Excretion of NaSCN (mgm. %)
1	1230	33.8	415.7	1250	17.6	210.0	1330	14.0	189.6
2	1210	32.8	396.9	660	19.4	128.0	1860	10.5	195.3
3	1210	18.2	220.2	1520	11.5	174.8	1520	10.3	156.6
4	860	10.9	93.7	760	14.4	109.4	490	11.5	56.4
5	1290	7.0	90.3	940	10.9	102.5	620	10.9	67.6
6	690	7.0	48.3	950	7.8	76.1	1840	6.3	115.9
7	920	6.3	57.9	990	7.8	77.2	1000	6.3	63.0
8	1660	4.3	71.4	550	8.9	49.0	1250	5.9	73.6
9	1850	3.9	72.2	1330	6.7	89.1	1450	4.3	62.4
10	850	4.8	40.8	930	5.9	54.9	1160	5.9	68.4
11	1530	3.4	52.0	980	4.3	42.1	1220	4.3	52.5
12	1430	3.4	48.6
Total excreted			1608.0	1114.1			1101.3		
Total injected			1580.0	1440.0			1340.0		
Recovery			100.0% +	77.0%			82.0%		

Using this constant in our formula, we attempted a final concentration of 8 mgm. % in three subjects and obtained end-points of 7.6, 7.6 and 7.8 mgm. %—an average of 96% of the desired level, and well within the range of our experimental error.

Excretion of KSCN.—Studies were next carried out on the excretion of the drug. It was proposed to measure the thiocyanate radicle in

photoelectric method and the impracticability of the procedure.

We were the more ready to abandon this research, and also an investigation of a third avenue of possible excretion—perspiration—because our urinary studies unexpectedly revealed that some individuals, at least, eliminate thiocyanate completely in their urine. Thirteen subjects were loaded, a few by mouth, most parenterally, and 24-hour urine collections were made and studied for periods up to 11 days following. Of the three subjects to whom the drug was orally administered, a recovery* averaging 61% (range 42 to 75%) was obtained. The average recovery from 8 subjects "cyanated" intravenously was 83% range 63 to 100% (2 cases). Two subjects loaded by both routes showed larger recoveries from the intravenous dosing (82 and 77% respectively as against 66 and 42% respectively from oral administration). (See Tables I and II and Charts 1 and 2.) We felt this sufficient grounds for postulating indifferent intestinal absorption as the major factor governing the end results following oral administration of the drug.

Further modification of formula.—For practical considerations, we felt that it was inadvisable to utilize the intravenous route when using the thiocyanates therapeutically. Despite

*Error in the colorimetric estimation of urinary thiocyanate was avoided by using an untreated specimen as a blank against which the colorimeter was standardized.

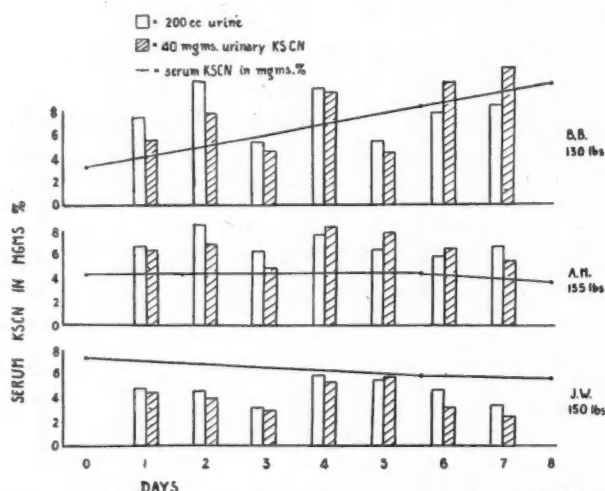


Chart 1.—Loading and excretion study using KSCN orally.

the urine and faeces of subjects receiving this material. Demonstration of urinary thiocyanate was very simple; its presence in the faeces could never be proved. Simple recovery experiments from aliquots of stool, (from which the bile salts had been absorbed by Fuller's earth) proved the insensitivity of our

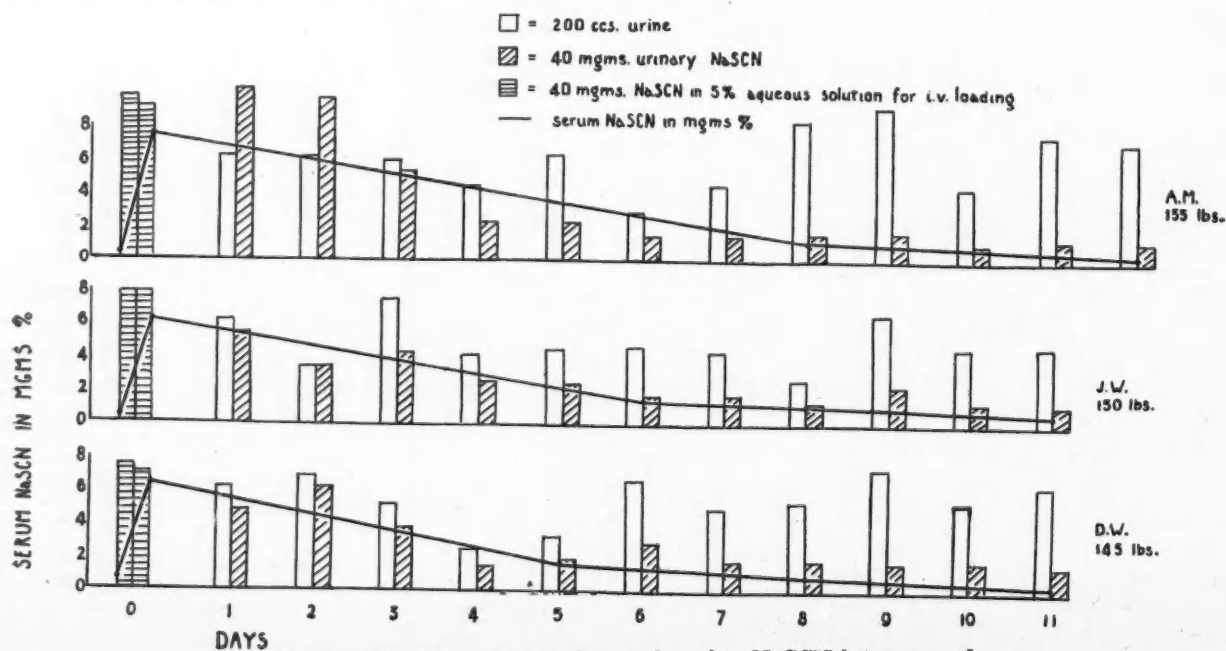


Chart 2.—Loading and excretion study using NaSCN intravenously.

the incompleteness and variability of intestinal absorption when the selected preparation of potassium thiocyanate was given orally, we attempted to devise a formula which would help us determine a loading procedure, which would be safe and applicable under widely varying conditions. Returning to our previous formula, we raised the constant from 1.4 to 1.7 (to allow for the increased atomic weight of the potassium salt used in the enseals). Assuming an average weight of 150 lb. and a desired serum concentration of 10 mgm. %, there would be required, for massive loading (allowing 100% absorption and no excretion of the drug during the loading procedure), $150 \times 1.7 \times 10$ or 2,550 mgm., that is, between twelve and thirteen 200 mgm. enseals.

TABLE III.
LOADING LEVELS OF GROUP 1—24 HOUR METHOD

Subject	Weight lb.	— Serum KSCN in mgm. % —			
		Basal mgm. %	24 hours mgm. %	7 days mgm. %	14 days mgm. %
1	145	0.3	9.8	8.0	9.4
2	155	1.3	8.5	11.2	11.2
3	145	0.3	9.0	7.7	7.4
4	145	0.9	9.0	8.5	8.5
5	190	0.5	6.5	5.2	5.2
6	140	1.0	10.5	8.0	8.0
7	150	0.7	9.8	8.5	9.4
8	145	0.7	8.5	4.3	4.3
9	185	1.3	8.5	5.7	4.7
10	175	1.8	8.0	7.0	5.0
11	135	1.3	9.0	9.8	14.8
12	150	0.3	9.4	8.0	5.0
13	180	0.7	8.5	8.0	6.0
14	130	1.3	9.0	2.7	3.8
15	130	1.0	6.8	7.2	7.0
16	126	0.3	7.0	12.2	9.0
17	160	1.0	8.0	5.7	4.3
18	127	1.0	12.2	11.5	10.5
19	150	0.3	9.0	9.8	8.0
20	145	1.0	7.0	8.5	4.4
21	115	0.9	12.5	14.5	14.8
22	175	0.3	6.5	6.8	4.4
23	165	1.0	9.0	9.8	9.4
24	150	0.7	8.5	8.5	11.2
25	148	0.9	7.0	5.5	4.3
Total.....		19.9	221.5	202.6	189.7
Average.....		0.8	8.9	8.1	7.6

This new formula was now tested by adopting two loading procedures and taking initial thiocyanate blood levels. The first procedure consisted of the administration of 12 tablets in 12 hours (3 doses of 4 tablets each) and the determination of the thiocyanate level at the end of 24 hours. The second procedure consisted of the administration of 13 enseals in six divided doses over a 60-hour period, with the thiocyanate level being determined at the end of 72 hours. The first procedure was tested on 25 medical

students and the second on 22. In each case, subjects were maintained, after the initial loading, on an empirically determined "maintenance" dose of 400 mgm. or two 200 mgm. enseals daily. Tables III and IV summarize the results of these trials.

The most notable feature of these tables is the scatter distribution of the serum levels obtained; there is no dominant trend in the group picture. The desired end-result had been 10 mgm. %. The 24-hour loading average approximated this most closely—being 8.9 mgm. at the end of 24 hours, 8.1 mgm. on the 7th day and 7.6 mgm. on the 14th day (see Chart 3). That is, there was considerable constancy in the average levels, with a fall of only 1.3 mgm. over a two week period. Further, the apparent heter-

TABLE IV.
LOADING LEVELS OF GROUP 2—3 DAY METHOD

Subject	Weight lb.	— Serum KSCN in mgm. % —			
		Basal mgm. %	72 hours mgm. %	7 days mgm. %	14 days mgm. %
1	120	1.0	9.8	9.8	10.5
2	145	1.0	8.5	9.0	9.8
3	110	1.0	9.4	8.0	7.0
4	130	0.7	8.5	10.5	11.2
5	138	0.7	9.4	9.8	15.4
6	156	1.3	8.5	6.5	7.4
7	175	2.7	7.4	3.3	3.3
8	180	0.7	3.8	5.2	4.3
9	160	1.0	5.7	7.0	8.0
10	145	0.7	5.7	5.2	3.8
11	150	1.3	8.0	9.8	8.2
12	145	0.7	4.3	8.0	9.8
13	210	1.0	6.0	5.2	7.4
14	170	1.0	5.2	7.0	9.4
15	137	1.3	5.2	7.4	5.0
16	145	0.3	7.0	9.0	11.5
17	165	1.0	6.8	8.0	8.0
18	150	0.3	6.0	7.2	7.4
19	148	1.0	7.0	9.4	11.2
20	145	0.3	3.8	6.0	5.7
21	148	1.1	7.0	8.0	8.5
22	130	0.7	8.5	9.6	8.0
Total.....		20.8	151.15	168.9	180.8
Average.....		0.9	6.9	7.7	8.2

geneity of the thiocyanate curves was shown on analysis to be due to the variation in the subjects' weights. Thus, 13 subjects with weights below 150 lb. (average 136 lb.) had serum levels rising higher than the median for the group (9.8, 8.3 and 8.1 mgm. % respectively). The twelve students with weights over 150 lb. (average 165 lb.) had serum concentrations slightly lower than the group medians (8.3, 7.9 and 7.0 mgm. % respectively).

The 72-hour loading method shows the same absence of a predominating pattern. The average serum concentrations after 3, 7 and 14 days,

were 6.9, 7.7 and 8.2 mgm. % (see Chart 4). The curve joining these points rises constantly over the 11-day period by an amount (1.3 mgm. %) similar to the decline of the line joining the medians of group 1. As in group 1, the irregularity of the plotted serum values is related to the weight variation of the subjects.

DISCUSSION

While the initial level after loading by this method averaged 2 mgm. % less than by the 24-hour method, the levels obtained are, for clinical purposes, not significantly different. With both procedures, the patient is carried to the lower level of the therapeutic range (8 to 14 mgm. %), which is all that should be attempted safely with any patient who is being "cyanated" for the first time. In the first group, about one-half the patients approximated the desired 10 mgm. % figure. In the remainder, it was felt that variations in weight, body build, extracellular fluid and, most importantly, the degree of intestinal absorption of the drug, accounted for any discrepancies noted.

An obvious reason for the failure of more patients in the second group to attain the desired end-point was the actually smaller loading dose. These patients were provided with only one extra 200 mgm. enseat to balance their excretion of the drug over a 72-hour loading period when, as it was later realized from studies on the maintenance dose, five tablets would have been a fairer allowance.

If we now inspect the maintenance levels of group 1, following the initial loading period, from the viewpoint of range rather than of averages (See Table 3), it will be seen that the levels after 24 hours ranged from 6.5 to 12.5 mgm. %, after 7 days from 2.7 to 14.5 mgm. % and after 14 days from 4.3 to 14.8 mgm. %. Two subjects only, Nos. 11 and 21, developed dangerously high concentrations. No. 21, a 115 lb. female, had an initial loading concentration of 12.5 mgm. % and her level rose steadily thereafter. By contrast, No. 18, a 127 lb. female, had nearly the same initial loading level, 12.2 mgm. % but her level subsequently declined progressively. On the other hand, No. 11, a 135 lb. male, had a concentration of 9.0 mgm. % at the end of 24 hours, maintained approximately the same level during the next week, but showed a rise of 5.8 mgm. % to 14.8 mgm. % during the second week. These examples emphasize the individual variability of absorption and excretion.

A similar analysis of the range of serum concentrations in group 2 (see Table IV) shows serum values after 72 hours ranging from 3.8 to 9.8 mgm. %, after 7 days from 3.3 to 10.5 mgm. % and after 14 days from 3.3 to 15.4 mgm. %. With the exception of the last named, No. 5, a 138 lb. male, all concentrations may be considered safe.

It is evident from these results that, using an arbitrary maintenance dose of 400 mgm. or 6 grains daily, the thiocyanate levels were some-

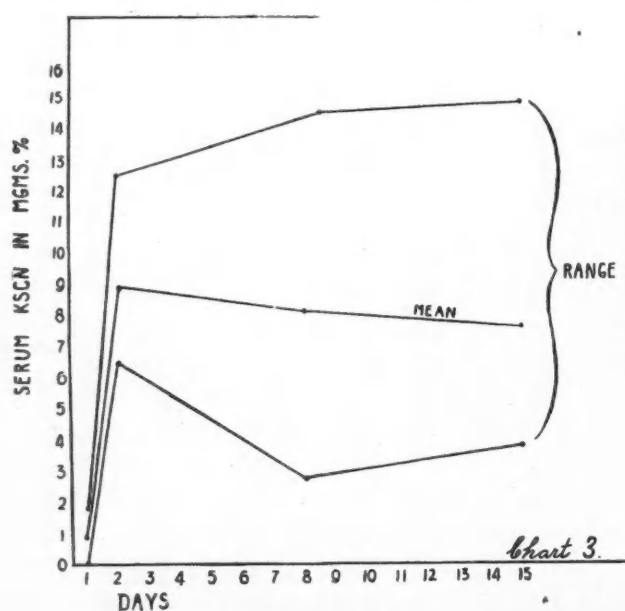


Chart 3.—24-hour loading and maintenance study using KSCN orally.

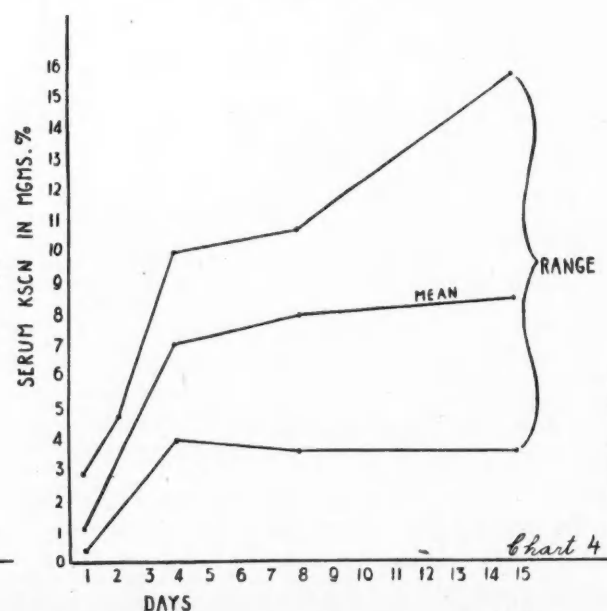


Chart 4.—72-hour loading and maintenance study using KSCN orally.

what more stable in the second group loaded over a 72-hour period. In actual clinical practice, however, the first method of 24-hour loading is greatly to be preferred and one of us (W.F.C.) has used this method over a three-year period in his hospital practice and has found it to be safe and satisfactory. The procedure at present adopted is as follows:

An arbitrary loading dose is selected, averaging 12 x 200 mgm. enseals of potassium thiocyanate. This dose is reduced in the case of very small adults to 10 enseals, and increased in the case of very large adults to 14 enseals. These are now given in 3 doses at 4-hourly intervals (originally 6-hourly). The following morning, 24 hours or less after the first dose, a serum thiocyanate estimation is done, and 2 enseals are given; one in the morning and one in the evening. This procedure is repeated daily thereafter, but if the initial level of thiocyanate is within the therapeutic range, and the daily levels thereafter continue to rise, the maintenance dose is adjusted appropriately downwards. Conversely, of course, a larger daily dose may be administered to those patients whose level, after 24 hours, is

below the therapeutic range. It is exceptional to find a level of less than 6 mgm. % after the loading dose. A number of patients have been found, however, whose daily requirement, to maintain a therapeutic level, approximates 3 enseals, or 600 mgm. It should be emphasized that, not only does the maintenance dose vary widely from patient to patient, but it may vary considerably in the *same* patient from time to time.

After a decision to try thiocyanate has been made, we have usually found it possible, with the above method, to achieve therapeutic blood levels within a 24-hour period, and to observe the effects of such levels on the patient's symptoms and blood pressure thereafter over a period of 4 or 5 days. At the end of this time, it has usually been possible to decide whether a continuation of the therapy is worthwhile, and also to arrive at a fairly accurate idea of the daily maintenance dose required to maintain the desired serum concentration of the drug. After discharge from hospital, arrangements are always made for a careful follow-up, either by the family physician or in our out-patient clinic. For some weeks, the serum level of thiocyanate

TABLE V.
TOXIC REACTIONS DURING EXPERIMENTAL ADMINISTRATION OF POTASSIUM THIOCYANATE ENSEALS
24-HOUR LOADING

Initials	Reactions	Serum KSCN level
1. W.W.	Severe headache (subject experienced slight malaise before starting experiment).	November 1, 1945, 1.3 mgm. % November 2, 1945, 9.4 mgm. % Drug discontinued.
2. J.M.	Reddish maculopapular eruption over face, neck, trunk, extremities, especially flexor surfaces. Appeared 7 days after starting, resolved 2 to 3 days after withdrawal.	November 1, 1945, 1.3 mgm. % November 2, 1945, 8.5 mgm. % November 8, 1945, 11.2 mgm. % November 11, 1945, 11.2 mgm. %
3. M.V.	Maculopapular eruption over back and flexor aspect of forearms. Appeared 4 days after starting loading, disappeared 4 days later.	November 1, 1945, 1.0 mgm. % November 2, 1945, 7.0 mgm. % November 9, 1945, 3.3 mgm. % (3 days after drug stopped.)
4. G.M.	Severe coryza, 24 hours later. Redness and marked swelling of periorbital area (right) 2 days later. Nausea and vomiting. Subconjunctival hæmorrhage. 1.5 cm. (right) and conjunctival injection (left) on 4th day. Edema did not disappear after s.c. injection of adrenalin m. v.	November 1, 1945, 0.7 mgm. % November 3, 1945, 8.5 mgm. % November 12, 1945, 5.2 mgm. % (7 days after drug stopped).
5. C.R.	Occasional reddish papules over feet and legs accompanied by chilblains. Both disappeared 5 days later.	May 7, 1945, 0.6 mgm. % May 8, 1945, 7.6 mgm. % May 14, 1945, 8.0 mgm. %
3-DAY LOADING		
1. J.P.	"Coryza" (Asthma since childhood, uses ephedrine inhaler).	November 2, 1945, 0.9 mgm. % November 5, 1945, 7.0 mgm. %
2. K.J.	Headache—2 days after starting. Drowsiness—7 days after starting. Reddish maculopapular eruption, 0.5 cm. in size, over lumbosacral area (disappeared 3 days after withdrawal).	November 2, 1945, 1.3 mgm. % November 5, 1945, 7.0 mgm. % November 8, 1945, 7.4 mgm. %
3. M.K.	Nausea, vomiting, diarrhoea during loading period.	November 2, 1945, 0.3 mgm. % Drug discontinued.

is determined at weekly intervals; after a fair degree of stability is achieved, this determination is carried out fortnightly.

The selection of patients.—The proper selection of patients for thiocyanate therapy is of the utmost importance. An unwise choice of patient may prove just as serious an error as improper administration of the drug. Indeed, a number of the toxic reactions reported seem to have occurred in patients to whom the drug, in our opinion, should not have been given.

The prime indication for potassium thiocyanate is for the relief of the severe headaches of the hypertensive patient. In our experience, there is no other agent nearly so effectual in lessening the intensity and frequency of this distressing symptom. Indeed, we would agree

pressures in our clinic, but our results are not as good in this respect as have been reported by others.

The untoward reactions which we have encountered in therapeutic administration are given in Table VI. Viewed in retrospect, four of these patients, Nos. 1, 2, 4 and 6 should not have been treated with thiocyanate to obtain a hypotensive effect only. In patients Nos. 3 and 5, the drug was given properly for relief of severe headaches, and these reactions could not have been anticipated.

Undoubtedly, the special field for this drug is in the therapy of the relatively young person, with labile blood pressure (group 1 of Keith and Wagener's classification) and severe hypertensive headaches, usually of migrainous

TABLE VI.
REACTIONS OBSERVED DURING THERAPEUTIC ADMINISTRATION OF POTASSIUM THIOCYANATE ENSEALS

Initials and age	Diagnosis	Dosage	Reactions	Serum KSCN	Treatment
Mr. E.L. 68	Essential hypertension with failing adaptation, gr. 2-3 (angina pectoris).	gr. vi o.d. X14.	More numerous attacks of angina.	October 5, 1944, 0.3 mgm. % October 12, 1944, 5.2 mgm. %	Pt. discontinued treatment after first week. Died 6 weeks later.
Mr. C.R. 48	Essential hypertension, diencephalic syndrome, gr. 2.	gr. XXI Stat. (Jan. 20, 1945), then gr. iii OH4 x 3, then gr. iii o.d. After Feb. 15, 1945, gr. vi o.d.	Phlebitis of long saphenous vein (lt.) and venous plexus of lt. labia from Feb. 5 to 24, '45. Emesis on Feb. 20.	January 29, 1945, 1.3 mgm. % February 16, 1945, 6.0 mgm. % March 3, 1945, 7.2 mgm. %	H.W.B. locally. Therapy continued after discharge on Feb. 24, at O.P.D. Condition resolved March 17.
Mrs. C.D. 41	Essential hypertension, gr. 3.	gr. vi o.d.	Apthous stomatitis of tongue, lower gingivum, vermilion margin of lip. Feb. 20 to 23, 1945.	February 16, 1945, 11.5 mgm. % February 22, 1945, 10.5 mgm. %	Carbolic acid and alcohol locally. Placebos substituted for enseals. Condition resolved Feb. 25.
Mrs. N.H. 61	Hypertensive heart disease with congestive heart failure, gr. 3—endogenous obesity, pituitary type.	gr. vi t.i.d. X9 then gr. iii o.d. X3.	Severe pain in lt. hip and knee, Dec. 7. Acute hyperesthesia of lt. leg for 6 days (osteoporosis), drug fever, 99.4-100.4° for 3 days.	December 4, 1945, 0.5 mgm. % December 5, 1945, 3.4 mgm. % December 6, 1945, 11.9 mgm. % December 7, 1945, 18.4 mgm. % December 9, 1945, 12.9 mgm. % December 12, 1945, 6.9 mgm. %	Therapy stopped. Dec. 7. Symptoms subsided 5 days after withdrawal.
Mr. C.S. 58	Hypertensive heart disease with failing adaptation, gr. 3.	gr. vi o.d.	Severe occipital and temporal headache for 2 days commencing Aug. 14. On Aug. 16, temp. 102°, sweating, marked weakness, locomotor instability, nausea, several emeses. (thiocyanate poisoning).	August 12, 1945, 12.5 mgm. % August 17, 1945, 15.4 mgm. % August 20, 1945, 9.0 mgm. %	Admitted to hospital. Enseals stopped. Phenacetin gr. v and caffeine gr. ii p.r.n. for headache. Asymptomatic except for headaches on discharge Aug. 23.
Mrs. S.E. 71	Generalized arteriosclerosis. Hypertensive heart disease with failure, gr. 3. Coronary thrombosis (old). kyphosis.	gr. vi b.i.d. X9.	Severe retromammary pain dyspnoea at rest, considerable weakness on Oct. 12.	October 7, 1945, 1.0 mgm. % October 10, 1945, 10.5 mgm. %	Drug stopped. Nitroglycerine gr. 1/100. Demerol 2 c.c. IM repeated twice. Oxygen therapy. Pt. died 2 months later.

with Page and Corcoran⁸ that for this symptom, at least, it is "a sovereign remedy". We have also used thiocyanate with complete success in a case of severe migraine unassociated with hypertension, as had been reported earlier by Hines.⁹)

Potassium thiocyanate should not be used primarily for its hypotensive properties, which, in our hands, are not impressive. We have seen appreciable reductions of both systolic (up to 60) and diastolic (up to 30 mm. of mercury)

type. Thiocyanate can also offer to some patients in Keith and Wagener's group 2, who have more fixed and higher pressures, and some evidences of vascular strain, a worthwhile postponement of cardio-vascular senescence. Of course, as more extensive arteriosclerosis and calcium deposit occurs in the arteries of patients in the more severe stages of hypertension, less retardation of ageing would naturally be expected, and in practice, we do

not use thiocyanate in Keith and Wagener's groups 3 and 4.

We believe that thiocyanate is contraindicated in:

1. Patients over 60. The benign systolic hypertension manifested by most of these patients is usually asymptomatic, unless their physician has indiscreetly allowed them to become alarmed. Since this senile form of hypertension is due chiefly to arteriosclerosis of the aorta and other great arteries, one would expect no appreciable effect from the thiocyanate radicle, which probably acts on the precapillary arteriole. Indeed, any attempt to treat this form of benign senile hypertension with drugs is "meddlesome therapy".¹⁰

2. Patients with cardiac or cerebral complications. It is only to be expected that if thiocyanate, administered to a patient with angina, does succeed in lowering the blood pressure appreciably, its effects may be the opposite of beneficial. Lowering of the coronary pulse pressure may critically lessen the oxygen supply to the myocardium, and embarrass or seriously endanger the patient.

Whether intimal hæmorrhage that may damage the endothelium and enhance thrombosis, as noted by Paterson,^{11, 12} is of the same pathogenesis as the petechiæ or intracutaneous hæmorrhages noted by Griffith¹³ in his capillary permeability test remains to be demonstrated. However, the latter has stated that a petechial index of 8 to 13 is a moderate, and of more than 13, a definite contraindication to thiocyanate medication. He believes that thiocyanate increases capillary fragility, although he feels that in some cases rutin¹⁴ may be given orally to repair this damage, thus salvaging these patients for thiocyanate therapy.

Patients with failing renal reserve may commence suddenly to accumulate the thiocyanate, and in a few instances, this has led to severe intoxication and death within a few days.¹⁵ All that can be done in the case of such a toxic pile-up is to withdraw the drug and stimulate glomerular filtration with physiologic saline intravenously. Thiocyanate is rather obviously contraindicated in any patient with myocardial failure, since a further reduction of arterial pulse pressure, and of tissue perfusion (if effected), would only further embarrass an overtaxed organ.

3. Patients with a history of drug intolerance.

4. Patients who cannot have blood estimations performed at regular intervals. This may be due to transportation difficulties, psychological irresponsibility or inaccessibility of superficial veins in obese persons. As already stated, our practice is to make a serum estimation every two weeks, unless the patient's optimum therapeutic level has been established at less than 6 mgm. %, as may sometimes happen. In these cases, we feel that a monthly estimation is safe.

5. No patient with malignant hypertension (and established papillœdema) should be given thiocyanate. We have followed several patients relieved of crippling headaches with thiocyanates, into this phase of their disease, and have felt that the dangers of cumulation of the drug, because of the associated renal failure, were such as to vitiate its use.

SUMMARY

This report presents a method of administering thiocyanate to patients suffering from arterial hypertension with severe headaches. Earlier experiments on "cyanating" patients are detailed and, finally, the details of a practical method of applying and assessing this method of therapy are given.

For the "average" patient of 150 lb., the loading dose is suggested to be 0.8 gm. of potassium thiocyanate 4-hourly for 3 doses. The maintenance dose for the majority of patients is 0.4 gm. daily thereafter.

The indications and contraindications for this method of therapy are discussed.

This investigation was made possible by the Ontario Research Grant of Queen's University. Acknowledgment is also made to the co-operation of the 1945 intern class of the Kingston General Hospital and the years of Medicine '48 and Medicine '49 of Queen's University.

REFERENCES

1. GRIFFITH, J. Q. JR., LINDAUER, M. A., ROBERTS, E. AND RUTHERFORD, R. B.: *Am. Heart J.*, 21: 90, 1941.
2. RITTER, W. L.: *J. Missouri State Med. Ass.*, 38: 238, 1941.
3. HINES, E. A. JR.: *Med. Clin. N. Am.*, 30: 869, 1946.
4. BARKER, M. H.: *J. Am. M. Ass.*, 106: 762, 1936.
5. LAVIETES, P. H., BOURDILLON, J. AND KLINGHOFFER, A. K.: *J. Clin. Invest.*, 151: 261, 1936.
6. PAGE, I. H.: Personal communication.
7. BLANEY, L. H., GEIGER, A. J. AND ERNST, R. G.: *Yale J. Biol. & Med.*, 13: 493, 1941.
8. PAGE, I. H. AND CORCORAN, A. C.: *Arterial Hypertension; its Diagnosis and Treatment*, The Year Book Publishers Inc., Chicago, p. 34, 1945.
9. HINES, E. A.: *J. Am. M. Ass.*, 121: 1307, 1943.
10. CONNELL, W. F.: *Canad. M. A. J.*, 54: 348, 1946.
11. PATERSON, J. C.: *Arch. Path.*, 29: 345, 1940.
12. *Idem*: *Arch. Path.*, 22: 313, 1936.
13. GRIFFITH, J. Q. JR. AND LINDAUER, M. A.: *Am. Heart J.*, 28: 758, 1944.
14. GRIFFITH, J. Q. JR., COUCH, J. F. AND LINDAUER, M. A.: *Proc. Soc. Exper. Biol. & Med.*, 55: 228, 1944.
15. DEL SALOR, A., DUSSAILLANT, G., BRODSKY, M. AND RODRIGUEZ, G.: *Arch. Int. Med.*, 75: 241, 1945.

CANCER OF THE LIP***C. C. Burkell, M.D., D.M.R.T.***Saskatoon Cancer Clinic,
Saskatoon, Sask.*

LIKE malignant disease elsewhere, cancer of the lip is a grave disease. It metastasizes to regional lymph nodes and will eventually kill the patient unless it is treated adequately and at an early stage. Fortunately an ulcer or a growth on the lip continually reminds the patient of its presence. It can usually be easily recognized by the physician, although some of the early lesions arising from an area of hyperkeratosis may not be clinically so evident. Because of its accessibility, it lends itself to a number of ways of treatment. For these reasons its radiological management presents an interesting problem.

This paper is a review of some 534 cases of cancer of the lip which have been treated radiologically. It comprises the consecutive cases seen in the Saskatchewan Cancer Clinics of Regina and Saskatoon to the end of 1943. All cases included in this series have had their cancers proved by histological examination of a biopsy specimen. All patients have had their entire treatment carried out at one or other of the above mentioned clinics. There were some cases, particularly in the early years, who were treated on clinical grounds alone. They are not included in this series.

Cancer of the lip is a common form of malignant disease. Of 2,254 consecutive cases of malignant disease seen in the Saskatoon Clinic, 254 of 11.3%, were patients who had a cancer of the lip. Martin¹ of the Memorial Hospital, New York, reports cancer of the lip to comprise 4% of all their cancer admissions, while Ackerman and Regato² report cancer of the lip to represent between 25 and 30% of all forms of cancer of the oral cavity.

It affects all age groups. The youngest patient in this series was 22 years of age, while the oldest was 86. The mean age was 57 years. The greatest number of patients fell in the decade between 50 and 59 years of age (Fig. 1; Table I).

However, when we compare the percentage of cases in each age group with the percentage of

the population in each age group (Fig. 2), we find the incidence of cancer of the lip to increase with age.

In our series there is a slight decline over 80 years of age, but this may be statistically insignificant, since there were only 14 patients over 80 years of age.

Cancer of the lip is predominantly found in men. There were 527 male (98.6%) as compared to 7 (or 1.4%) of female patients. Cross *et al.*³ report 2% female patients from the Pondville Hospital whereas Howes and La Rosa⁴

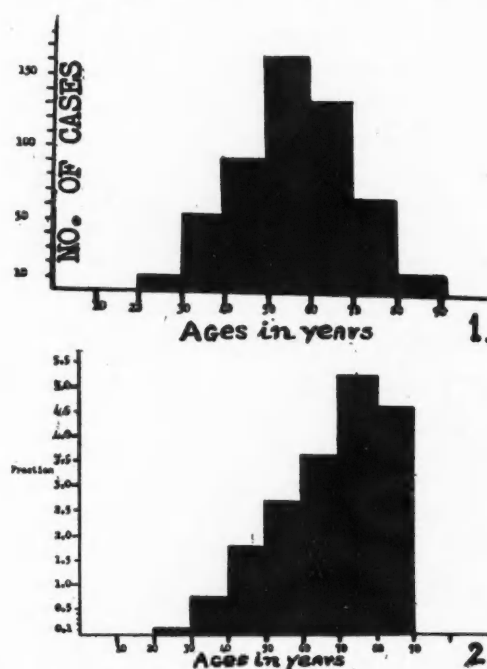


Fig. 2.—Fraction: percentage of patients in each age group to the percentage of the male population in each age group, multiplied by 1,000.

TABLE I.
AGE DISTRIBUTION

20 - 29 years	10
30 - 39 years	53
40 - 49 years	92
50 - 59 years	165
60 - 69 years	133
70 - 79 years	67
80 - 89 years	14
Total	534

report 1.7%. Of interest in this respect is a report from Radiumhemmet in Stockholm where cancer of the lower lip is common in women—Martin¹ quotes a figure of 16% in this respect.

Most reports mention the predominance of cancer of the lip in outdoor workers who present a long history of outside exposure. There were 476 patients, in the present series, who belonged to this class. Of greater value, however, is the

* Read before the Eightieth Annual Meeting of the Canadian Medical Association, Section on Radiology, Saskatoon, June 16, 1949.

fact that 440 of these, or 82% of the total number of cases, were farmers. The Dominion Bureau of Statistics report that only 67.5% of the male population of Saskatchewan, over 14 years of age, were gainfully employed in agriculture in 1941 (a representative year in our survey). That is, there were 2.1 times as many farmers in Saskatchewan as male persons of other occupations. However cancer occurred 4.5 times more frequently among farmers than these others. That is, cancer occurred 2.15 times more frequently among this occupational group than in the rest of the male population.

Only 6 (1.1%) of these patients had a positive Wassermann reaction. This is less than reported in most series (Martin¹ 10% Cross³ 7.2%).

Most of the cases occurred on the lower lip (97%) as is usually the case. Martin¹ reports 93% while Cross *et al.*³ report 97% for lower lip and commissural lesions. Martin rather stresses that 56% of his series occurred on the left side of the lower lip, although reports in the older literature indicated a right-sided preponderance. In the present series the distribution was as follows:

TABLE II.
SITE OF LESION

Right lower lip	198
Left lower lip	213
Mid lower lip	93
Whole lower lip	11
Lower lip (not specified)	5
Upper lip	14
Total	534

We do not feel that such a distribution is of any statistical importance in an etiological study.

Many patients had a long history of a pre-existing lip disease; 24.5% or 131 patients, had a definite history of having had a chronic ulcer, leukoplakia, recurring cracks, keratosis, or chronic epithelial hyperplasia before the development of the cancer. The duration of these lesions varied from 9 months to as long as 20 years. The average duration was 46 months. When the above patients are excluded, 343 (64%) of the patients gave the duration of the lesion from one month to one year with the mean duration as 4.8 months and the median duration as 3 months. Fourteen patients with carcinoma of the upper lip had their lesions for an average of 5.7 months before presenting themselves for treatment. Of the 15 patients

who had significantly enlarged nodes when originally seen, the average delay in seeking treatment was 23 months. In 31 cases the duration of the lesion was not specified (Table III).

TABLE III.
AVERAGE DELAY PRIOR TO TREATMENT

	No. of cases	% of total	Average delay
No history of pre-existing lesions	343	64.2	4.8 mons.
History of pre-existing chronic lesion	131	24.5	46.0 mons.
Significantly enlarged nodes when originally seen	15	2.8	23.0 mons.
Carcinoma of upper lip	14	2.6	5.7 mons.
Duration not specified	31	5.8
Total	534	100.0	

Pathology.—Carcinoma of the lip is almost invariably an epidermoid carcinoma. In the present series this was the histological diagnosis in 529 cases. One patient was reported to have an intra-epidermal carcinoma (Bowen's disease), one a carcinoma *in situ*, one a basosquamous carcinoma and two were reported as basal cell carcinomata. These latter two are worthy of further mention.

CASE 1

A 45-year old female patient presented herself with a history of having a sore on the right side of the lower lip for the past 5 years. She was definite that it first started on the vermilion surface from where it spread to involve the skin just below. On examination, a lesion with the appearance of a basal cell carcinoma was present at the mucocutaneous junction. There was some scarring on the vermilion surface of the lip adjacent to it. Clinical diagnosis: "Cicatrizing rodent ulcer". Pathological report: basal cell carcinoma.

CASE 2

A 48-year old male patient who had had a small growth on the mucosal surface of the upper lip for 4 years. Recently it had become superficially ulcerated. On examination, the patient had a 1 cm. lesion on the mucosal aspect of the upper lip. The lip had to be everted in order to expose the lesion. Clinical diagnosis: "Ulcerated mucous cyst". Pathological diagnosis: basal cell carcinoma.

Martin¹ states that basal cell carcinomas never arise in mucous membrane. Whether the above two cases should then be included in this series is, therefore, a matter of opinion. However, as the diagnosis was made by the pathologist, they have been considered as belonging to this group of lip malignancies.

Histological grading was given, along with the type of carcinoma, in nearly all cases. Those that were not so graded were considered as belonging to grade I. Although no rigid criteria were established for the grading, the pathological

work was done for the main part, by either one or other of two histopathologists. The results are given in Table IV.

TABLE IV.
HISTOLOGICAL GRADING

Diagnosis		No. of cases	Percentage
Epidermoid Carcinoma	Grade I.	271	50.7
	Grade II.	232	43.4
	Grade III.	26	4.9
Others	Basosquamous carcinoma	1	1.0
	Bowen's disease	1	
	Carcinoma <i>in situ</i>	1	
	Basal cell carcinoma	2	
Totals.....		534	100.0

Staging.—There is still no nationally or internationally accepted method of staging. For the purpose of this survey, the method employed at the Holt Radium Institute⁵ and other centres in England was adopted. This is as follows.

Stage I. The primary has not spread beyond the tissue of origin to such an extent as to produce definite clinical evidence of loss of mobility or function in the affected part. The area must not measure more than 3 cm. across its greatest dimension. There must be no palpable cervical lymph nodes.

Stage II. The primary has spread beyond the tissue of origin to the above extent, *e.g.*, loss of mobility or function, fixation to the underlying muscle or bones, or radiographic evidence of bone involvement. There must be no palpable cervical lymph nodes.

Stage III. As in 1 or 2, but unilateral lymph nodes of malignant type are present without definite evidence of extra-capsular spread.

Stage IV. (a) As I or II with lymph nodes of malignant type and definite evidence of extra-capsular spread. (b) Bilateral lymph nodes. (c) Remote metastases. (d) Severe cachexia or toxæmia.

By far the greatest number of cases fell into the Stage I group as would be expected—Table V.

TABLE V.
CLINICAL STAGING

	No. of cases	Per- centage
Stage I. (less than 3 cm. in size) ...	481	90.1
Stage II. (over 3 cm. in size)	35	6.6
Stage III. (with significant nodes) .	15	2.8
Stage IV. (far advanced disease) ..	3	0.5
Totals	534	100

Metastases.—Only 18 of the patients (15 patients with Stage III lesions, and 3 patients with Stage IV lesions), or 3.4%, had lymph nodes which were malignant when the patient was first seen. Many others had lymph nodes palpable in the submental or submaxillary areas which were clinically suspicious, but as time elapsed, their innocence became apparent. The criteria for those considered malignant was not as rigid as one would wish. However, if the node continued to enlarge, became fixed, and eventually progressed to kill the patient, they were classified as being malignant, even though no biopsy was obtained. Furthermore, some of the nodes were incised or excised and a pathological examination was made. This procedure was adopted on 6 patients, *i.e.*, those who had either a partial or complete block dissection, local excision, or in one case, a radon gold seed implant. When the above two groups are taken from the original 18 patients, there remain only 2 patients about whom the diagnosis is in doubt. The criteria for these 2 patients were as follows: a hard node in the immediate lymph drainage area which was increasing in size, not painful, and not connected with any other demonstrable cause.

These 18 patients, on the average, had delayed seeking medical attention for 23 months as compared to 4.8 months for the patient without lymph node involvement. One patient, however, had delayed only 2 months, while several had waited for 3 years. As would be expected, very few of these had a histological grade I cancer. In fact, there were only 4 belonging to that grade. The majority, 12 cases, were grade II, while the remainder, or 2 patients, had a histological grade III lesion.

After successful treatment of the primary lesion, lymph node metastases may become apparent. The interval between the treatment of the primary and the appearance of the secondary lesion varies considerably. In this series, 16 patients developed malignant lymph nodes, that is, 3%. The interval between the treatment of the lip primary and the development of the secondary deposit in the lymph node varied from 2 months to 45 months. The same criteria for metastatic malignancy were adopted in this as for the previous group. In this case, there were 11 patients who died from cancer, 3 who had either a block dissection or an incisional biopsy, and only 2 who were left in

the indefinite group. A summary of these two groups of patients who had metastatic malignancy is given in Table VI.

TABLE VI.
LYMPH NODE METASTASES:
MALIGNANT LYMPH NODES
PRESENT WHEN ORIGINALLY SEEN

No. of pts.	Average duration of primary	Grade of primary with number of pts.	Method of diagnosis
18	23 months (2-36 months)	Grade I. 4 Grade II. 12 Grade III. 2	Died from Ca. 10 Pathological 6 Clinical 2

MALIGNANT LYMPH NODES
WHICH SUBSEQUENTLY DEVELOPED

No. of pts.	Grade of primary with No. of pts.	Interval between treat. of primary and develop. of secondary	Method of diagnosis
16	Grade I. 7 Grade II. 7 Grade III. 2	Average 21 mos. (from 2-45 mos.)	Died from Ca. 11 Histologically 3 Clinical 2

Treatment.—The treatment was carried out by the members of the respective clinics. Varieties of methods were used, but the majority of patients were treated by either x-radiation or radium implants. Table VII is a summary of the treatment methods.

TABLE VII.
TREATMENT METHODS

Radium implants.....	349
X-radiation.....	115
Miscellaneous treatment methods:	
Radon gold seed implants and x-radiation...	21
Radon gold seed implants.....	14
Electro desiccation and radon gold seed implants.....	13
Surgical excision alone.....	9
Surface plaque.....	4
Radium implant and x-radiation.....	4
Radon plaque and gold seed implant.....	3
Radon vaselin, radium bomb and gold seed implant.....	1
Radium implant, gold seed implant and x-radiation.....	1
	70
Total.....	534

There were not enough patients treated by any one of the miscellaneous treatment methods to form an opinion as to the value of the par-

ticular treatment. With the other two methods, however, we have a moderately large number of patients in each group from which we may draw some conclusions. The particular method chosen depended somewhat on the inclination of the therapist, but it also depended to some extent on the type of case, for example, those who had far advanced disease, or those who had major lesions were treated by x-radiation, as illustrated in Table VIII.

TABLE VIII.
SELECTION OF CASES
BETWEEN RADIUM IMPLANT AND X-RADIATION

X-radiation		Radium implant	
No. of pts.	% of group	No. of pts.	% of group
Stage I.....	103	326	93.4
Stage II.....	5	20	5.9
Stage III.....	5	2	0.6
Stage IV.....	2	1	0.3
Totals....	115	349	100.0

It is seen that a greater percentage of Stage I and Stage II lesions were treated by means of radium implants, whereas more patients with Stage III and IV lesions were treated by x-radiation. However the bias is not great.

Recurrences.—It is often difficult to distinguish a new lesion from a recurrence particularly when it occurs near the edge of a previously treated area. Consequently, in this analysis, all cancerous lesions which subsequently developed on the lips have been termed recurrent disease. Some of these were undoubtedly new lesions since they occurred on the opposite side of the lip or, in one case, on the opposite side of the upper lip whereas the original lesion was on the lower.

There were 28 patients, or 5.2%, who thus developed a "recurrence". They developed their "recurrences" anywhere from 6 months to 10 years after the treatment of the original lesions. It is also felt that some of these very late "recurrences" were undoubtedly new lesions.

In the final analysis, those patients who had developed a "recurrence" after treatment of the primary and who have not yet been followed for a period of 5 years were classed as treatment failures. Treatment of these recurrent lesions was divided equally between surgical excision and further radiotherapy. An

argument has been advanced for surgical excision as the treatment of choice for primary cancer of the lip by Cole.⁶ He believes that if surgery is necessary to effect a cure of a recurrence the piece of lip which must be removed to be clear of the previously radiated zone, is usually so great that either a serious defect is left in the lip or some type of plastic reconstruction is necessary. Admittedly this is true in a few cases but only 14 of 534 were subjected to subsequent surgery in this series. To submit the other 520 patients to surgery primarily which has equally as high a recurrence rate, (Cross *et al.*³), does not seem justified.

Results.—In calculating the net end-results the accepted method of subtracting those cases who died from intercurrent disease without evidence of cancer or those who have been lost to follow-up, has been adopted. The following table illustrates the method by giving the net 5 year end-results in this series of 534 patients.

TABLE IX.*
FIVE YEAR END RESULTS IN CANCER OF THE LIP
SASKATCHEWAN CANCER CLINIC

Total number of patients treated (to end of 1943)...	534
Indeterminate group:	
Died of other causes and without recurrence.	42
Lost track of without recurrence.....	16
Total number of indeterminate group.....	58
Determinate Group (total No. minus indeterminate group).....	476
Failures:	
Dead as a result of cancer.....	29
Well but have had a recurrence within 5 years	21
Total number of failures of original treatment.....	50
Successful results:	
Free from disease after 5 years or more.....	426
FIVE YEAR END RESULTS:	
Successful results divided by determinate group	426
—=89.5%	476
Gross Survival—well 5 years following original treatment 447	—=94%
—	476

*Modified from Martin *et al.*¹

Such a table by itself, however, does not explain the whole picture. If this table is compared with reports from elsewhere^{1, 3, 5, 7}, the net end results discussed in this paper appear much better. However, when we look at the end result

by stage of the disease, an explanation for the higher figure is obtained, Table X.

TABLE X.
FINAL RESULTS BY STAGES

	Number of patients treated	5 year net survival
Stage I.....	479	93%
Stage II.....	36	69%
Stage III.....	15	33%
Stage IV.....	3	0%

For comparison the final results by stages as reported by the Holt Radium Institute, Manchester (1934 to 1938)⁵ is given. These results have been chosen for comparison since the same method of staging has been employed in each group.

TABLE XI.
FINAL RESULTS BY STAGES
HOLT RADIUM INSTITUTE, MANCHESTER
1934 - 1938

	Number of patients treated	5 year net survival
Stage I.....	89	79%
Stage II.....	58	67%
Stage III.....	17	27%
Stage IV.....	11	11%

Whenever ionizing radiation is used for the treatment of a particular disease, preference is usually given by the therapist to a particular means of administering that radiation. Some therapists prefer radium, either as moulds or as interstitial implants, while others prefer the use of x-radiation.^{8, 9} Table XII is a technique analysis between the two most frequently used methods in this series.

TABLE XII.
TECHNIQUE ANALYSIS

Technique	Number of patients treated	5 year net survival
X-radiation.....	115	85%
Radium implant.....	349	91%

The 6% difference shown between the two techniques may be statistically insignificant. As pointed out before there was a bias toward using radium implantation for Stage I and Stage II lesions. Furthermore, the number of patients placed in the indeterminate group as having died from intercurrent disease was proportionately much greater in the x-radiation

group—20 patients out of 115—whereas there were only 16 out of 349 in the radium implant group. This would seem to indicate a further degree of selection, *i.e.*, older patients, or those whose general condition was poor, were treated by means of x-radiation.

Cosmetic results.—No discussion regarding the treatment of cancer of the lip would be complete without mention of the final cosmetic result. One of the most serious criticisms to the surgical treatment of cancer of the lip is the resulting scar and occasional puckering of the lip which occurs. In general, the cosmetic result following properly administered radiation is good. Certain factors, however, have been observed to lead to defects in the treated area. For instance, improper removal of tissue for pathological examination by using transverse instead of vertical incisions will cause such a defect. The development of a secondary infection during the radiation reaction tends to cause an excess of tissue damage. Finally the improper placing of radium needles during an implant may cause an intense zone of irradiation leading to a localized necrosis which heals only slowly leaving a depressed scar.

TABLE XIII.
DIED AS A RESULT OF CANCER

Died of cervical lymph node metastases which were present when the patient was originally seen	
Stage III.....	10
Stage IV.....	3
	13
Died from cervical metastases which subsequently developed.....	12
Died postoperatively following a block dissection of cervical nodes.....	1
Died from visceral metastases (as stated on death certificate although there was no post mortem examination).....	2
Details not known—cause of death as stated on death certificate "Cancer of lip".....	1
Total.....	29

CONCLUSIONS

1. Cancer of the lip can be cured by radiotherapy in a very high percentage of cases provided treatment is instituted early.
2. The choice of a particular radiotherapeutic technique is not important provided meticulous care in the planning and execution of that technique is taken. This is necessary to minimize the recurrence rate and to insure good cosmetic results.

3. Radiotherapy is not the treatment of choice for metastatically involved lymph nodes. In the present series, three patients were said to have been "cured" by radiotherapy but only one of these had histologically proved cancer in the nodes. Greater success is obtained by a radical block dissection. Douglas¹⁰ quotes a figure of 44% net five year survivals in this respect.

4. Prophylactic block dissections are not indicated. Figi,¹¹ while doing 549 prophylactic operations, found metastatic nodes in only 91 (16.5%). In this series only 34 patients (6.3%) had secondarily involved nodes at any time (15 patients in stage III; 3 patients in stage IV; and 16 patients who subsequently developed nodes). Even the operative mortality of 5% is nearly as great as the risk of developing nodes. When one is able to receive patients with early disease, then an intelligent follow-up system proved satisfactory.

SUMMARY

The result of treating 534 consecutive cases by radiotherapy is reviewed. The overall 5 year net survival was 89.5%. From a study of these cases, cancer of the lip is discussed from the standpoint of etiology, pathology, metastases, and the choice of radiotherapeutic technique.

REFERENCES

1. MARTIN, H., MACCOMB, W. S. AND BLADY, J. V.: *Ann. Surg.*, 114: 226, 1941.
2. ACKERMAN, L. V. AND DEL REGATO, J. A.: *Cancer, Diagnosis, Treatment and Prognosis*, C. V. Mosby Co., 1947.
3. CROSS, J. E., GURALNICK, E. AND DALARD, E. M.: *Surg., Gynec. & Obst.*, 87: 153, 1948.
4. HOWES, W. E. AND LAROSA, F. J.: *Am. J. Roentgenol.*, 47: 37, 1942.
5. *Idem*: *Am. J. Roentgenol.*, 60: 763, 1948.
6. The Results of Radium and X-ray Therapy in Malignant Disease, Second Statistical Report from the Holt Radium Institute, Manchester, E. & S. Livingstone, Ltd., 1946.
7. COLE, P. C.: *Brit. J. Surg.*, 36: 79, 1948.
8. RICHARDS, G. E.: *Canad. M. A. J.*, 35: 490, 1936.
9. PATERSON, R.: *The Treatment of Malignant Disease by Radium and X-rays*, Edward Arnold & Co., London, 1948.
10. SMITHERS, D. W.: *Post-Grad. M. J.*, November, 1939.
11. DOUGLAS, W. D.: Personal communication.
12. FIGI, F. A.: *Surg., Gynec. & Obst.*, 59: 810, 1934.

Experimental Aortic Anastomosis, Glenn, F. and others, *Proc. Soc. Exper. Biol. & Med.*, 71: 619, 1949. Seven young dogs between the ages of three and eight weeks were subjected to end-to-end anastomosis of the thoracic aorta. Three of these dogs survived and were studied approximately one year after operation to determine the status of the site of anastomosis. Narrowing of the aortic lumen at the suture line was demonstrated in each animal by angiocardiographic methods and also in one animal at thoracotomy. This is of significance in that with the resection and anastomosis operation for coarctation of the aorta, an aortic lumen may be established at the anastomosis which is satisfactory for a child of a few years of age, but would probably be insufficient in size when the patient grows to maturity.

ARTHRITIS—PLAN FOR ATTACK*

Prepared by the Canadian Arthritis and
Rheumatism Society

Ottawa, Ont.

IN preparing this Plan, the Canadian Arthritis and Rheumatism Society has been deeply conscious of the magnitude of the problem which arthritis presents. It has been equally aware that a very great deal can be done, to relieve both the suffering of individuals, and the present drain on the nation's economy. The plan has been prepared as a basis for practical discussion and subsequent action by those associated with the Society, as well as for all doctors and thoughtful citizens interested in the control of rheumatic diseases.

The Society recognizes that a problem so extensive can be solved only through many years of tireless effort, and that all plans must be such that they can be easily modified in the light of newly-achieved knowledge, and of local conditions. At the same time, it reiterates its sincere conviction that much can now be done which will be of immediate value, and which may well provide the base of operations from which these diseases can ultimately be conquered.

It is also recognized that a plan of attack on arthritis can be carried out only through the effective co-operation, interest and participation of many agencies and groups, notably the medical profession, health and hospital authorities, medical schools and the general public. The Plan herein proposed discusses the rôle of such groups in a co-ordinated attack, and describes the Society's own position in relation thereto as but one active part of a greater whole; for, although the Society can be a spark plug, it cannot be the whole engine.

**PART I. THE PROBLEM OF RHEUMATIC DISEASES
IN CANADA**

Rheumatic diseases, which include arthritis, remain one of the most important unsolved problems which disease presents to our community. If all cases were diagnosed in their early stages and promptly submitted to the treatments, which present medical skill can suggest, there would be a prompt and great reduction in the number of lives wrecked by its ravages.

* Abridged from a longer and more general paper.

The social and economic importance of these diseases is clearly demonstrable in that an estimated 100,000 Canadians are totally or partially disabled by rheumatic diseases and an estimated 600,000 Canadians¹ are affected in varying degrees. As a result, Canadian workers lose an average of \$54,000,000.00 in wages annually.

Attention to rheumatic diseases is becoming widespread, as evidenced by post-war professional and non-professional movements in many countries. At present the arthritides (especially deforming rheumatoid arthritis) present the most serious problem, but the most fruitful results are possible in their control. Owing to the complexity of, and difference between these diseases, there is no such thing as an over-all arthritis cure. With dissemination of present knowledge throughout the whole profession, combined with adequate facilities for diagnosis, treatment and rehabilitation, from 80 to 90% of arthritis victims can remain or be rendered employable, or able to lead near-normal lives, even if not completely cured. This augurs well for future treatment.

PART II. PLAN FOR A CONCERTED ATTACK

"There is no refuge in the excuse that, since medical knowledge of causes and of the most efficacious treatments is incomplete, nothing can be done. In the majority of cases a great deal can be done. Even if there were no hope of gaining further knowledge by research—which, emphatically is *not* the case—yet the national application of present methods of cure and alleviation would lift much of the burden of rheumatic disease from the community."²

In developing any program designed to make the best possible treatment available to all victims of rheumatic disease, and in particular, deforming arthritis, four factors must be considered at the outset:

1. No one body, official or otherwise, has a universal authority such as would enable it to chart and organize the provision of needed facilities by its mandate. The development of such facilities can be brought about only through the co-operative action of many organizations, such as the medical profession, hospital authorities, university medical schools, public health departments, the sufferers themselves, and society generally. The prospects for carrying into effect any given program depend almost wholly upon its quality and flexibility, and the degree to

which it is accepted as correct by those who direct or influence the various organizations concerned.

2. The number of physicians specially trained in the diagnosis and treatment of these diseases is severely limited. Any scheme must, therefore, not only make the most efficient use of the knowledge already available, but also contribute to its extension throughout the medical profession generally.

3. There already exist extensive facilities for both public and private medical care; in view of the large number of people concerned, these facilities must be utilized, adapted, increased and directed to the end that the best possible treatment becomes universally available to the victims of rheumatic disease. It would be impractical to devise a scheme of treatment facilities separate and distinct from that now in existence.

4. Long-term planning is essential. Unless we know the general direction in which we are moving, we cannot take our first steps.

Importance of early diagnosis and prompt treatment.—"The basic approach to chronic disease must be preventive, otherwise the problems created by chronic diseases will grow larger with time and the hope of any substantial decline in their incidence and severity will be postponed for many years."² Until the exact causes are known, measures to prevent the onset of arthritis cannot be devised. Present effort must be directed toward the prevention of serious disability.

In the treatment of rheumatic diseases, especially deforming arthritis, the best hope of success rests in the capacity to detect early symptoms and to put into effect the best safeguards against development of serious invalidity. That patients are received too late is the complaint of every physician or surgeon concerned in the treatment of this malady. "Certain American workers have demonstrated the point with almost mathematical precision. Cecil and Adams found that 82% of patients treated in the first six months of the disease either recovered completely or were greatly improved, and that the percentage of favourable results decreased with each year of delay in obtaining treatment. . . ."³

Because of the great numbers of sufferers involved, and the consequent impossibility of providing a specialist or special hospital to care for each one, *faith must be reposed in the main*

body of medicine, i.e., the family doctor, and this policy is highly desirable for many other reasons. Early diagnoses will be made in direct ratio to his capacity in detecting early signs and symptoms. The assistance of specialists and of specialized institutions should be regarded as reinforcements to be available whenever needed. A full recognition of the important rôle of the general practitioner is implicit in this plan.

While the great majority of sufferers could attain alleviation or cure without significant disruption of their lives, there are many who require long periods of hospitalization. Long-term hospitalization is extremely expensive, and is not generally available, to people of limited or modest means who suffer from chronic illness. Physicians may know that their patients require prolonged rest and extensive treatment in hospital. Yet this knowledge will give them but little comfort, and the patient but little relief if this hospitalization is not available.

Elements of the plan.—The plan herein proposed may be considered under four separate although related headings: (1) Increased facilities for diagnosis and treatment. (2) Professional education. (3) Research. (4) Other provisions.

INCREASED FACILITIES FOR DIAGNOSIS AND TREATMENT

Special treatment centres and local clinics.—The broad range of medical facilities already in existence includes a number of hospitals which are teaching centres for the various university medical schools. On the whole, it is these hospitals which are best supplied with radiological, pathological, biochemical and therapeutic resources which have the greatest facilities for research, and which have at their command leading specialists in all aspects of medicine and surgery related to the diagnosis and treatment of rheumatic diseases. Because they are teaching hospitals, they are the logical foci for the postgraduate and undergraduate education necessary to diffuse throughout the profession the most up-to-date knowledge. A few of these hospitals have developed in varying degree special clinics, services or departments for the treatment of rheumatic disease.

For these reasons, it seems best that special treatment centres for rheumatic diseases be established at teaching hospitals. This is fundamental to the plan herein proposed. In those areas where teaching hospitals do not

exist, special treatment centres should be established at the leading hospitals.

Local clinics with facilities less extensive than those of a special treatment centre should be established, probably giving out-patient service only, at local general hospitals on a part-time basis. These local clinics should be associated with the special treatment centre at the nearest teaching hospital in the same informal way that local and teaching hospitals are associated in the special treatment of other diseases.

Classification of patients according to diagnostic and therapeutic needs.—Patients may be classified according to the particular diagnostic or therapeutic needs which they present. The suggested classification excludes that largest proportion of sufferers whose diagnosis and treatment can be effectively carried out by the general practitioner with or without the aid of a private consultant. It is concerned only with those cases whose diagnosis and treatment require more extensive measures. The family doctor is the best judge as to whether a particular patient needs to be referred to a special centre or to a private consultant, and accordingly, except in the case of indigent patients, these centres should accept patients only when referred by a doctor, either general practitioner or private consultant.

The classification follows: (1) A large proportion which, after attending at the out-patient department of the special treatment centre or local clinic, may be returned to their own doctor with a complete analysis of diagnostic factors, and an outline of the recommended program of treatment. In the case of indigent patients, treatment could be continued under the direction of the centre's out-patient department. (2) A fairly large proportion would, after preliminary investigation at the centre's out-patient department, be admitted to hospital. Such admission would be for two main reasons: (a) complete investigation over a two-to-four week period, and/or (b) instruction of the patient and his family in those simple measures of treatment which can be carried on at home, and in the proper regimen to be followed. On discharge, these patients, too, would be referred back to their own family doctor. (3) A small but nonetheless significant proportion who require to be hospitalized for special treatment of 6, 12 or 18

months' duration for the prevention or correction of deformities.

It will be neither unduly expensive nor complicated to provide the special treatment centres and local clinics required to meet the diagnostic and therapeutic needs of the patients in the first two of the foregoing classes. At both local general hospitals and at teaching hospitals, many of the facilities and skills required already exist, and it is but necessary to add those which are missing and orient the whole to the task. It should not, of course, be thought that a complete scheme of local clinics and special treatment centres could be created overnight. Probably the most limiting single factor is the number of physicians presently available with the special training, knowledge and enthusiasm required to direct such centres. As, however, special treatment centres are developed, selected physicians may attend as postgraduate fellows, after which they could be placed in charge of or practice in still other centres or local clinics. Thus, professional education and the special treatment centres go hand in hand, and the availability of both will increase in a sort of geometric progression.

Adequate resources for intensive physical therapy are essential to the modern treatment of deforming arthritis. The establishment of a clinic or centre for the indoor or outdoor treatment of chronic arthritis at most general hospitals would necessitate expansion of physiotherapy departments.

Accommodation for long-term patients.—Most difficult to meet will be the needs of the patients in the third mentioned class who require long-term hospitalization. At present, such hospital accommodation is almost totally non-existent. Too often, patients in this class can not be admitted to hospital until a stage of hopeless invalidity has been reached, or, if admitted, must be discharged to make room for patients acutely ill from other diseases. Many—probably most—reach and continue to live in a stage of hopeless invalidity without ever having received proper treatment. Even were the beds to be available, the majority of these patients could not afford to pay the costs of treatment, nor would it be paid for them under conditions of public medical care now prevailing in most communities.

At this time, it is impossible to estimate the number of patients annually who would require this form of long-term treatment. It should be

recognized, however, that the screening carried out at the special treatment centres would, in a relatively short period of time, give a fair indication of the numbers requiring it.

The needs of this group of patients are comparable to those of the tuberculous. Before adequate hospitalization was available for the tuberculous, and before governments, directly or indirectly, made provision for the payment of costs of treatment, the tuberculous attempted to carry on normal activity until their disease was far advanced, and their prospects of life greatly lessened. Those arthritics requiring long-term treatment today must, of necessity, carry on as best they can until they, too, have no reasonable prospects of regaining or retaining their health.

Incurables.—The plan herein proposed does not contemplate the hospitalization of incurables, but an effort should be made to ensure that such cases are actually incurable before they are so classified. In addition, many cases incurable in light of existing treatment facilities may at least be rendered employable, or able to lead near normal lives as facilities are expanded. So, too, the welfare, nursing home or familial care, and recreational needs of this group should not be forgotten.

DEVELOPMENT OF SPECIAL TREATMENT CENTRES

A special treatment centre cannot function efficiently without an adequate number of beds. To provide such beds in general hospitals may be difficult in view of present crowding; yet this is at the same time an argument for the designation of beds for this purpose. "The provision of a special wing or floor devoted to long-term patients insures that the special needs and problems of chronic disease are not lost sight of in competition with the more urgent and dramatic needs of the acutely ill."⁵ This point is especially worthy of consideration by hospital authorities planning new construction.

Nevertheless, special treatment centres with many desirable features can be established with little if any additional construction, through an effective utilization of existing space and facilities. Where the recommended number of beds cannot be made available, outdoor services only may be provided, although efficiency will be reduced.

The needs of the third class of patients who require long-term treatment for the correction or prevention of deformities can only be met by

additional construction of units of from 100 to 200 beds. The total requirement is not known, but as earlier mentioned, this can be ascertained through the screening to be carried out in the facilities described above. These units for long-term treatment need not necessarily be established in the immediate vicinity of the teaching hospital, although this would be desirable. They should, however, be professionally integrated with the teaching hospital, sharing the same directing and consulting staffs. They would, in fact, be an integral part of the special treatment centre, representing a further stage in its development.

The provision of additional bed units for the active remedial care—as opposed to nursing home care—of patients with chronic arthritis is closely related to the whole question of care for the chronically ill. Whether it is to be solved by the construction of additional designated bed units at or near general hospitals, or as a part of the more extensive development of chronic disease hospitals is a point which can only be decided in light of local circumstances.

Local clinics would undertake programs quite similar to those of special treatment centres, within the limits of their less extensive facilities. They would probably operate out-patient departments only, and on a part-time basis only.

Importance of social and vocational rehabilitation.—The most extensive treatment will still find many patients developing severe disabilities, and others in which disabilities cannot be wholly corrected. Yet many of them will have families to support. Thus, their medical and physical rehabilitation should be linked from the beginning with measures for social and vocational rehabilitation. Rehabilitation should start while the patient is under treatment. In many instances, the treatment provided will only make it possible for the patient to live in a better adjusted relationship with his or her disability. Rehabilitation can contribute to patient morale, and the group stimulus or therapy achieved by the concentration of patients of like disability at special treatment centres makes rehabilitation easier.

PROFESSIONAL EDUCATION

Professional education is fundamental to the scheme. While at the outset many physicians who are going to direct and practice in special treatment centres may have to be sent outside Canada for their training, ultimately this train-

ing can be given in the special treatment centres to be established. The training responsibilities of the special treatment centres would be:

Postgraduate.—(a) *Long-term fellowships.*—Fellowships of up to one year's duration should be accorded to well-qualified young doctors to prepare them for the direction of or to practice in special or local treatment centres. Generally speaking, they should be selected by university medical schools, and as a condition of taking the fellowship, should return to a part-time appointment at a teaching hospital, in order to disseminate their knowledge.

(b) *Short-term courses.*—Special treatment centres and local clinics should operate short-term courses of two to three days' duration for general practitioners, and conduct clinical demonstrations. Such courses would be designed to assist the general practitioner in making early and accurate diagnoses; in detecting cases which need to be sent to a special centre or consultant; and in the supervision of treatment measures in which the patient can co-operate outside hospital by following appropriate rest, physical exercises and regimen.

Undergraduate.—Increased and improved undergraduate education in the treatment and diagnosis of rheumatic disease will automatically follow from the establishment of special treatment centres at university teaching hospitals.

Technical.—The special training of technicians, and particularly, of physiotherapists, is an important educational function.

RESEARCH

The reason why one apparently healthy member of a family is afflicted with deforming arthritis while another escapes is still not known. Many aggravating or precipitating factors, such as infection, injury, exposure, mental stress, etc., are recognized, but the basic cause still remains an unsolved puzzle. It is probable that the "cure" for various types of arthritis will not be found until the specific cause is known. Consequently, there is an urgent need for fundamental and clinical research so that knowledge of the disease can be gradually extended.

A special treatment centre for arthritis provides an excellent opportunity for the clinical study of hundreds of different types of arthri-

tis which is not otherwise possible. Only by well-kept records and a systematic follow-up can the value of any treatment be properly assessed. The more fundamental aspects of research require a team of physiologists, biochemists, pathologists, etc., as well as expensive laboratory equipment which is already available in most universities. Our universities might well be encouraged to devote greater attention to rheumatic diseases, through professional stimulus and financial assistance.

Additional provisions.—Additional provisions should be contemplated. There is, for example, the need for greatly increased social and vocational rehabilitation services not only in direct relation to the local clinics and special treatment centres, but also through an appropriate rehabilitation agency capable of providing required vocational guidance, vocational training, job placement and other services necessary for the patient's restoration to work following hospitalization.

A body of mobile physiotherapists, available to supervise the patient subsequent to discharge, might materially contribute both to the reduction of relapses through failure to carry out medical instructions at home, and also shorten the patient's required stay in hospital. It is important to bring physical therapy for the purposes of prevention of deformity and maintenance of muscle power to those physically unable to attend a special treatment centre because of bed shortages or otherwise. If the patient cannot be brought to hospital, then perhaps the hospital can be taken to the patient.

This is of great importance. The mistaken impression that rheumatoid arthritis "must keep going at all costs" stems from the fact that in the past such patients were allowed to lie vegetating, with a pillow under the knees, half sitting up, and sooner or later froze in that position. It is now known that when weight-bearing joints are involved, rest in bed often allows the inflammation in these joints to subside. "Freezing" is unnecessary if supervision assures that each day the involved joints are carried at least once, gently through the fullest possible range of movement, and muscular exercises are performed frequently throughout the waking day to maintain muscle power. All of this should be combined with other appropriate treatments. In exceptionally severe

cases, destruction of one or more joints is sometimes inevitable. In these rare cases, supervision will ensure that the unavoidable fixation occurs in such a position that greatest usefulness is preserved.

Many of the patients suffering deforming arthritis are women, whose domestic responsibilities make it impossible for them to take the prescribed rest at home without some form of domestic assistance. A home-maker service appears to be a desirable adjunct. A combination of mobile physiotherapists, home-makers, social workers and vocational rehabilitation workers available to visit the patient at home, can do much to compensate at the outset for the lack of additional bed units for the provision of long-term treatment.

The mobile physiotherapists could operate either under the direction of the local clinic or special treatment centre, or on referral under the direction of the patient's own physician. Many areas can never support local clinics. Travelling clinics operating from special treatment centres will be necessary to give a proper coverage of less populous parts of the country.

PART III. ORGANIZATION OF THE CANADIAN ARTHRITIS AND RHEUMATISM SOCIETY AND ITS RÔLE IN A CONCERTED ATTACK ON ARTHRITIS

The Canadian Arthritis and Rheumatism Society was established in November, 1948. Its constitution calls for the creation of a division within each province, and local branches in the main centres of population. The affairs of the Society are directed by a National Board, which has the guidance of leading physicians, surgeons, and scientists serving on the Society's Medical Board. The affairs of the Provincial Divisions will be similarly directed.

There are six major projects which the Society proposes to undertake:

1. *Professional education.*—(a) A program of postgraduate fellowships to train young doctors in the most modern methods of diagnosis and treatment. (b) Assistance in the organization of special short courses for interested general practitioners.

2. *Research.*—To aid existing research facilities at universities and hospitals through a program of research grants and fellowships.

3. Awakening constructive interest among the medical profession and general public. The development of an informed public opinion will assist voluntary and government health authori-

ties to participate effectively in the overall program and therefore the Society will undertake to collect and disseminate factual information to medical and lay public.

4. Aid in establishing special treatment centres or local clinics, probably in connection with existing hospitals.

5. Promotion of beneficial legislation or other endeavours, to secure improved facilities for prevention, research, diagnosis, treatment, rehabilitation or general welfare.

6. Additional measures (*e.g.*, projects according to need and facilities such as homemaker service, mobile physiotherapy, etc.).

The Society will make annual public appeals for funds to enable it to carry out its program. It is believed that the constructive measures planned to reduce the economic waste and suffering caused by rheumatic diseases, will receive the financial support of business, the people, and their governments.

REFERENCES

1. Dominion Bureau of Statistics: Preliminary Report on the Incidence of Arthritis in Canada.
2. Lord Horder, *op. cit.*
3. Joint Statement of Recommendation "Planning for the Chronically Ill" by the American Hospital Association, American Public Welfare Association, American Public Health Association, American Medical Association—in the *J. A. M. A.*, October, 1947.
4. GLOVER, J. A.: "Report on Arthritis", Ministry of Health (U.K.) Reports on Public Health and Medical Subjects No. 52.
5. Joint Statement, *op. cit.*: *J. A. M. A.*, October, 1947.

CHILDREN'S HEALTH CENTRES AND THEIR USES*

Donald Paterson, M.D. (Edin.),
F.R.C.P. [Lond. & C.]

Vancouver, B.C.

[T may be well if we start by asking ourselves at once what is meant by a health centre for children. As I conceive it, its purpose should be to act as a consultative centre where advice can be sought on both the preventive and curative sides of children's diseases, in all their aspects. It is this close linking together of these fundamental aspects of child health under one roof which I wish to stress, and which are essential if the centre is to be a success.

Let me be more explicit. We should aim to gather in the one building a representative

* Read before the Eightieth Annual Meeting of the Canadian Medical Association, in General Session, Saskatoon, June 17, 1949.

clinic where advice is given on the health of well babies and how to keep them well, in addition to clinics where ill babies with digestive upsets and infections may be examined and treated by the most modern methods. All this involves a highly qualified staff of physicians, surgeons and nurses, and social service, and much modern technical apparatus.

This brings me to my second point. Such a centre to be successful must be placed alongside and be run in conjunction with a well-equipped and modern hospital, preferably alongside a university medical school. To gain the confidence of both profession and public, the service offered must be the very best. In order to get the best type of man or woman to take part in such a centre the opportunity to teach must be available. It is essential, therefore, that such a centre with its various clinics should be made available for teaching interns, senior residents, nurses, and social workers, and of course medical students if they are available.

In most communities the public health services have established themselves as a distinctly separate entity, and are much "cut off" from the rest of the profession. Their mental outlook seems different and often there is much antagonism between the two branches of the profession. To the modern physician and the general public this is old fashioned and somewhat ridiculous, and there is a tendency for this separation to cease and for the public health authorities and the practising paediatrician to work together amicably under the one roof.

This is brought about most quickly by an overlapping of the staffs of the two groups, public health officers being on the staff of the teaching hospital and members of the teaching hospital staff holding well baby clinics and school medical inspections, and being in charge of immunization clinics. After all, much of the work of the general practitioner and of the successful paediatrician is the giving of up-to-date advice to the public on how to keep well; or it should be.

The interns and residents should be allocated to the clinics for well babies, and sent out to do school medical inspections as part of their training. The teaching of medical students and under-graduate nurses on normal children impresses on their minds the wide variations of

the normal so that they can better appreciate the early signs of disease.

The basic clinics held at the health centre should be those presided over by the paediatrician. He is a general physician dealing with all diseases but confined to a certain age group. These clinics are best held daily and as large a staff as possible should take part, in order to ensure that the children are not kept waiting, and so that individual care can be given to each case. Each child should be properly undressed and dressing gowns provided, he should be carefully weighed and measured and temperature taken, and a specimen of urine examined. If this is carried out, the doctor has much valuable information available before he actually sees the case. The routine application of a tuberculin patch test and the availability in the health centre itself of a fluoroscope will make the picking out of primary tuberculous infections much easier.

This preliminary inspection by the paediatrician should precede the sending on of any child to a special department. In this way the special departments are safeguarded against treating children who are, unknown to them, suffering from diseases outside their specialty.

The health centre should have available the best of scales for babies and for older children, and a laboratory with its technicians to test the urines and take the bloods for other necessary examinations, as ordered by the medical staff.

The Social Service Department is particularly important in a health centre. So often the homes are broken, and these patients will need help in obtaining appliances and often in supplying their children with milk and other necessities. Such homes will need to be visited and their domestic and emotional problems considered along with their physical problems. No modern health centre can function properly without a well-conducted social service department. The linking up of the health centre to the various social service agencies of a city is an essential in order to prevent duplication of effort and social work. As a training ground for students in social service this field is without parallel.

Another very essential clinic is the follow-up infant feeding clinic. Infants are discharged from the maternity wards on the 8th to 10th day and they may be breast fed or bottle fed. Often it is the mother's first baby. If well-to-

do they return to their family physician and comfortable home and helpful friends. Many, however, have none of these to return to. A follow-up clinic should be available immediately. Here the nursery supervisor from the maternity hospital who knows the mother and infant and is aware of the obstetrical history and the feeding difficulties should be present and it is possible with encouragement and advice to prevent the failure of breast feeding in an appreciable proportion of cases. This is the most critical time in the infant's life and the one very often most neglected.

The Ear, Nose and Throat Clinic is one of the largest clinics to be arranged for. Many children are referred from the school medical service for infected tonsils and ear discharge. After all, the commonest illness in infants and children seen in general or paediatric practice is an infection of the nose and throat.

It becomes increasingly apparent that the proper place to deal with chronic ear discharge and deafness is not in the general ear, nose and throat clinic but in a special one devoted to the ear and the hearing only. This is a special study and to help the otologist a lip-reading therapist and teacher who is skilled in the ascertainment of deafness in infants and very young children should be in attendance. These two work together. The audiometer and other modern aids to the measurement of hearing should be available. To be really successful, it is necessary to start lip reading at one year or 18 months, and in this way psychological disturbances and difficulties are prevented which seem inevitable when lip reading education is started as now at the age of five or six years.

The work of the Eye Department may well be divided into three parts. First, the main eye clinic, where children are seen for the first time by the eye surgeon; here the cases are sorted and a rough testing of the eyesight is done. Next, cases suitable for orthoptic treatment are referred to that department, and thirdly, others will be referred for refractions and glasses. The majority of children attending the eye clinic are of school age and there are many myopes. If they are without their glasses for any length of time this affects their school work. Sufficient help in the refraction clinic is necessary to ensure short-waiting lists.

A special clinic for diseases of the skin and also a clinic for diseases of the chest is most desirable.

The Psychiatric Clinic must be looked upon as most important. Group conferences should be held between the psychiatrist, child psychologist, psychiatric social worker, school teacher, public health nurse and the paediatrician who has examined the child from the physical standpoint. At such a conference, all the aspects of the child's problem are discussed. The home surroundings and emotional background are reported on. The school teacher hears what others think of her problem and a line of treatment is decided upon. There can be no question at all that such conferences are of the utmost use to the mother and the child and all those who impinge on the child's life. As a method of teaching these conferences are fascinating in the extreme. The bed-wetter, the truant, the exhibitionist and the epileptic are discussed in turn, and, handled by a good psychiatrist, the conferences are highly educational.

The Dental Clinic should be used largely for emergency extractions and orthodontia. Routine dental work should be undertaken by a well-organized school dental service rather than at the health centre which should act more in a consultative capacity.

The Orthopaedic Clinic offers great scope for preventive treatment. Club-feet, knock-knees, flat feet, poor posture, as well as fractures and bone infections make up much of the work seen at such a centre. This clinic will require the use of a large consulting room, which is best cubieled so that three or four children may be undressed and ready for examination in his or her own cubicle. The surgeon can pass rapidly from one to the other dictating his notes and making his suggestions directly to the splint-maker or physiotherapist, and the liaison between these three cannot be too close.

Next to the consulting room he has his plaster room and x-ray room where he may see the wet films taken at the time of the child's visit.

One would like to have the services of a good speech therapist for stammering children, a physiotherapist for crippled children, a laboratory technician trained in taking blood from children, a radiologist and trained clinical and nursing staff. Training in diseases of children and public health work is desirable in the nursing staff as it gives them a much better grip of the problem of clinic work.

The conducting of a model well baby clinic at such a centre is most desirable, as it introduces normal infants and children into the lives of the young nurse and doctor and gives them an opportunity to learn preventive work under the best possible circumstances. Too often well baby clinics are held in poor surroundings

where it is draughty and cold and unhygienic and the babies cannot be undressed properly and good work and good teaching are much hampered. It is therefore beneficial to the staff of the public health unit who hold their clinic at the health centre as it requires a much higher standard of work on their part and

ATTENDANCES EACH MONTH

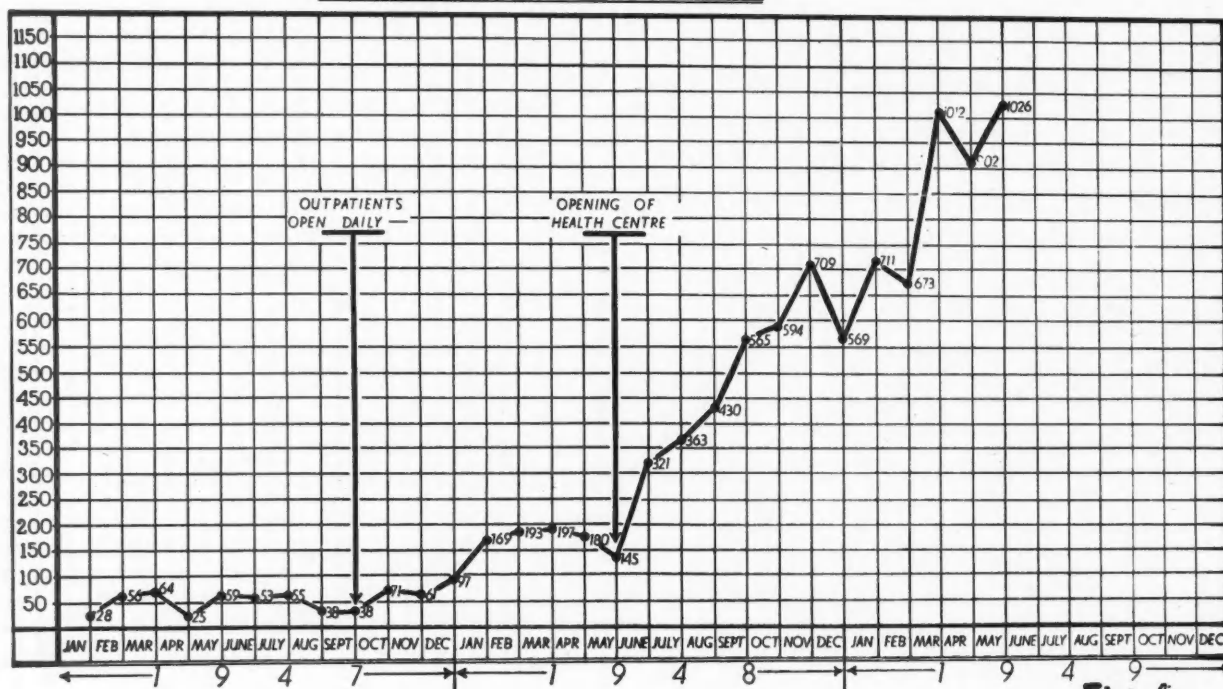


Fig. 1.

Fig. 1.—Monthly attendances at the clinic during 1947, 1948 and 1949

	PAEDIATRICS	EYE	ALLERGY	ORTHOPEDIC	EAR NOSE & THROAT	SKIN	SURGERY	SQUINT	CARDIAC	DIABETIC	CHEST	FEEDING	PSYCHIATRY	REFRACTION	Total
June 1948	279	9	3	7	23										321
July 1948	240	23	29	9	50	12									363
Aug 1948	294	27	24	24	53	7									429
Sept 1948	361	22	48	35	51	22	4	22							565
Oct 1948	381	34	55	17	58	15	2	32							594
Nov 1948	469	34	57	20	58	16	8	47							709
Dec 1948	325	27	61	21	76	11	4	33	11						569
Jan 1949	438	51	68	30	66	7		37	13	1					711
Feb 1949	418	33	66	29	58	23	1	34	8	2	1				673
March 1949	589	56	91	46	136	19	4	40	15		9	7			1012
April 1949	490	56	92	56	87	25	10	40	16	1	5	23	1		902
May 1949	483	52	96	68	69	26	8	84	11		2	20	10	97	1026
Total	4767	424	690	362	785	183	41	369	74	4	17	50	11	97	7874

TOTAL NEW PATIENTS ————— 1551
 TOTAL ATTENDANCES ————— 7874
 TOTAL OPERATIONS ————— 300
 ADMISSIONS TO HOSPITAL ————— 411

Fig. 2.—Clinic attendances from June, 1948 to May, 1949

Fig. 2.

gives them the stimulus of teaching which is so essential.

A very popular clinic is that dealing with allergy. Here children suffering from hay fever and asthma are x-rayed, skin tested and treated. The large attendance suggests its necessity.

The Rheumatism and Cardiac Clinic should be under the supervision and care of a paediatrician with special training in cardiology. He should have first-class equipment if he is to do a good job. He must be supported by an efficient pathological laboratory and x-ray department and have the use of an electrocardiogram. He must be associated with an experienced cardiac surgeon. It should be possible to pick out from the mass of material offered, those cases suffering from rheumatism, cardiac disease and congenital malformations of the heart. His nurses should be able to visit the homes of the patients when necessary, and physiotherapy should be available both at the clinic and in the child's home, as well as modified education and occupational therapy. Long stay hospitals should also be available for such patients.

To illustrate the working of a health centre for children, I might mention briefly our centre started just one year ago in connection with the Vancouver General Hospital. A very old building, two stories high, and 40 feet square, was rehabilitated by a cheque from the Rotary Club. Generous citizens then gave the money to pay the staff for the first year. Figs. 1 and 2 show the record of our attendance as a whole, and of the attendance at each clinic, some of which as you will see, have just commenced.

The success of this venture depended on the quality of the service given and the co-operation of the Metropolitan Health Department of Vancouver. Only those patients were seen whose means conformed to the hospital standards for outpatients, namely, \$110 per month for man, wife and one child, rising by \$20 for each additional child.

Questioning the mothers of the children, it was apparent that 90% of this group of children who were largely referred by the school medical service, had seen no other doctor than the school doctor at any time and were able to make use of this service because it was free. It appears that this service did not in any way compete with the practices of the general prac-

titioner, nor the paediatrician, and the fact that the numbers have greatly increased suggests that the service was necessary in this community.

May I quote from that newest and monumental report of the American Academy of Paediatrics, 1949, on "Child Health Services and Paediatric Education".

"The modern hospital has become an essential of the social structure to which we are accustomed. It serves not only as a place where the sick may be given in-patient care but also a *health centre* for the entire community with its out-patient service, public health clinics, training for physicians and nurses and health education for the public. Without access to a good general hospital, no community is adequately equipped to fight against ill health."

To conclude, therefore, I would say that a health centre is not just a hospital outpatient department but it also embraces community services and public health services and these should be made available at all modern hospitals. An example of their need is shown by their attendance at the newly opened Health Centre for Children, Vancouver. It, I think, demonstrates the co-operation between curative and preventive medicine which is so essential if we are to offer complete health services to the community.

MODERN TREATMENT OF NEUROSYPHILIS*

George B. Sexton, M.D.

*Faculty of Medicine, University of
Western Ontario, London, Ont.*

THE observations and conclusions recorded in this paper are based on the experience obtained in the treatment of neurosyphilis, through the management of an out-patient venereal disease clinic and fever therapy department, associated with Victoria Hospital, London, for the past ten years.

The first thing in retrospect that strikes me, and I am sure it has been common experience, is the apparent ignorance or negligence of the physician, or lack of co-operation of the patient, which has allowed him to reach the advanced stage of neurosyphilis before a diagnosis is made. These cases have always appealed to me as a real tragedy, particularly when they reach

* Read at the Annual Meeting of the Ontario Neuro-psychiatric Association in Toronto, February 18, 1949.

the advanced stages of paresis, tabes dorsalis, or when total blindness intervenes. This of course refers to the management of such cases in general practice, and indeed I may say in the medical practice of specialists. I believe that the mental health clinics, co-operating so admirably in various centres, have a special function in picking up these neglected cases. Constant vigilance must be exercised if one is not to be caught napping. It should be routine procedure to do a spinal fluid examination; not only in the adults but on the child of teen-age with vague neurological symptoms, who may surprise you with a positive spinal fluid.

Although there is a relatively higher overall percentage increase of neurosyphilis, compared to early syphilis,* reported from 1944-48, there is a decrease in the total number reported to the Venereal Disease Division of the Ontario Government (1944-48). This would indicate that the improved epidemiological set-up in the province is getting these patients under adequate treatment earlier. I think it is well borne out in our local situation, in the London district, where the admission rate to the Ontario Hospital has been reduced yearly. On further scrutiny, however, it was found that this reduction locally was greater than the reduction in the admissions of neurosyphilitic patients in all the Ontario mental hospitals (see Table I). This is un-

TABLE I.
PERCENTAGE OF NEW ADMISSIONS OF NEUROSYPHILITIC PATIENTS

	To all Ontario hospitals	To Ontario hospital, London
1937	5.3	5.5
1938	6.3	4.1
1939	5.5	3.7
1940	5.6	2.5
1941	6.1	3.3
1942	5.0	3.0
1943	4.5	3.1
1944	5.3	2.6
1945	5.3	2.7
1946	4.4	2.1
1947	3.7	2.6

Showing the greater decline in the admission rate of neurosyphilitics in the Ontario Hospital, London, as compared to all the mental hospitals of the province.

doubtedly due, in part, to the establishment in 1938 of a fever cabinet centre in Victoria Hospital, London, which resulted in concentrating potential Ontario hospital patients to the Clinic, where many have been prevented from reaching

* Early syphilis is being reduced by the intensive treatment schedules introduced.

the advanced stages requiring Ontario hospital attention. It is indeed an enviable situation maintained by the Ontario Division of Venereal Disease Control, wherein the cost of hospitalization and the fever cabinet personnel have been made so freely available to the public. This has been broadened to include the free administration of penicillin to such patients, as well as other forms of chemotherapy.

Recent authoritative studies with the use of penicillin in the treatment of neurosyphilis indicate, without a doubt, that it is the drug of choice. Its relative lack of toxicity, shorter duration of therapy and the phenomenal response, especially of the spinal fluid serology, give it preference over the various older drugs formerly utilized, such as arsphenamine, mapharsen, neoarsphenamine and the pentavalent group, tryparsamide, acetarsone or aldarson, combined with the heavy metals and iodides. Its relative merits in relation to fever therapy is a controversial question at the moment. It should be borne in mind, however, that the care of the neurosyphilitic patient, as in other forms of syphilis, should be individualized. The type of treatment for a particular patient should be determined by the age, physical status, duration and variety of involvement of the nervous system. Neurosyphilis may not respond to one form of therapy and yet may show remarkable improvement with another.

The above facts would not seem to warrant such statements as made by Dattner¹ and his associates as follows: "We believe that penicillin will ultimately replace fever therapy", or by Curtis², who states: "Even in tabo paresis and paresis, there are indications that penicillin alone will eventually prove as effective as in combination with malaria". On the other hand, O'Leary³ states: "Although it is too early to compare the value of penicillin with that of other methods used in the treatment of neurosyphilis, my experience indicates that penicillin produces clinical improvement in from 15 to 20% of cases, while fever therapy produces improvement in from 60 to 80% of cases". Experimentally, Eagle, Magnuson and Fleischner⁴ find a striking increase in the efficacy of penicillin vs. rabbit syphilis, when the drug was given in conjunction with fever therapy. Reynolds, Mohr and Moore⁵ present a comparative study and conclude: "The effectiveness of concurrent penicillin-malaria therapy is such as to make it, for the present at least, the treatment

of choice for patients with dementia paralytica". An article by Stokes⁶ states: "In tabo paresis and meningovascular neurosyphilis, the results with penicillin are serologically superior and clinically equal to those with malaria". Interestingly he postulates that in the treatment of paresis, malaria fever usually shows more clinical improvement in the first year than penicillin; but that penicillin overtakes in the second and surpasses malarial therapy in the third year after treatment. Similar results are found in tabo paresis, meningovascular lues and tabes.

These divergent opinions, are, to my mind, well summed up by Solomon⁷ who states:

"This is very reminiscent of the difference of opinion which has occurred over the years as to the relative effectiveness of trypanamide, malaria and mechanically produced fevers. After exhaustive studies over a period of more than twenty years, no uniformity of opinion was reached. It is therefore not surprising that opinions should differ with regard to penicillin and it is probable that general agreement will not be attained in the course of a number of years."

Already, in my experience, cases where fever therapy was successful following an apparent penicillin failure, have been encountered. Three examples are listed below. One might go further and suggest that arsenicals of the pentavalent group such as trypanamide, still have a place with iodides and heavy metals in the management of the patient resistant to the more accepted forms of therapy. This brings into play not only a specific attack vs. spirochaetes and its variants; but a consideration of the resistance of the host. This latter would argue in favour of the addition of fever therapy in its safest modality, in view of its apparent stimulation of the defensive mechanism of the patient.

CASE 1

R.C., aged 37, with transverse myelitis, reported to a doctor, August 14, 1944, suffering with a penile chancre and bilateral inguinal adenopathy. A blood Wassermann proved positive with a quantitative titre of Kahn 4 units. He was given 8 injections of mapharsen 0.04, and 11 injections of bismuth salicylate gr. ii (intramuscularly). The arsenical injections were temporarily stopped because of upper respiratory infection. On November 30, 1944, the patient complained of severe pain in his left leg, paræsthesia and ataxia. He was transferred to hospital where total paralysis occurred with complete loss of bladder and rectal function. Penicillin therapy was administered both intramuscularly and intrathecally in 3,000,000 units dosage, with little or no improvement. On further medical advice he was referred to fever therapy. At this time a neurological examination revealed "almost complete paraplegia below D 10 with a complete loss of posterior column sensitivity and almost complete paralysis (there being slight improvement in the right leg) with diminished to absent reflexes and a positive Babinski, retention of urine, complete loss of pain and temperature over lower abdomen.

Patient was admitted to Victoria Hospital, London, Ont., January 19, 1945. A cerebrospinal fluid examination was made January 22, resulting as follows: cell

count, 21 per c.mm.; Wassermann, 41,000; total protein 129 mgm. per 100 c.c. Colloidal gold reaction 555421000. On February 9, fever therapy was initiated. This was continued at weekly intervals to a total dosage of 68½ hrs., at 105.4° F., along with 10 injections of aldarson, given in gm. dosage at weekly intervals. Improvement became very rapid, and, at completion of fever therapy, bladder and rectal sphincter control had improved and he was able to walk with the use of a cane or crutches. He was discharged from hospital March 28, and was able to return to his former occupation as a truck-driver. Another spinal was made June 25, with the following results; Wassermann 44,100, total protein 40 mgm. per 100 c.c., colloidal gold reaction unchanged.

Comment.—This case was formerly reported by me with the prediction that in the future, fever plus penicillin therapy might be the method of choice in the management of parenchymatous neurosyphilis.

CASE 2

R.K., aged 61, with paresis. This case came under my care in the latter part of April, 1948, with signs of early paresis as designated by a slight depression. His spinal report as of November 8, is as follows; cell count, 0 per c.mm. Wassermann 44400 (very strongly positive). Total protein 50 mgm. per 100 c.c., colloidal gold reaction 222210000.

He was hospitalized, receiving 6,000,000 units of penicillin over a period of 2 weeks, and discharged under observation. About the first of November, I received a telephone call from his physician that this man was acting in a peculiar manner, exercising poor judgment in his business dealings and spending his funds indiscriminately on various projects. For instance, he was at the moment in Toronto, negotiating the purchase of a \$1,300.00 yacht for his minister. He had written cheques for various large sums to public organizations. He was persuaded to return to me for further treatment and on November 8, was admitted to Victoria Hospital. The patient had delusions of possessing great wealth and was obviously suffering from grandiose ideas and was very euphoric. This man was undoubtedly a candidate for the Ontario Hospital, in spite of his initial penicillin therapy. However, it was decided, despite the hazards accompanying his age, 61 years, that we give him fever therapy. In January, 1949, he completed 70 hours of fever therapy at a temperature of 105° F. A cerebrospinal fluid examination was made on February 16, which revealed a cell count of 2 per c.mm., Wassermann 44400, total protein 50 mgm. per 100 c.c., colloidal gold reactions 34421000. Apparently he made a complete remission of his symptoms and appeared his normal, non-aggressive personality. He was modest and retiring and very much his old self.

Having a complete insight into his former state, he felt keenly the shame and embarrassment afforded his family. On discharge from hospital, February 10, it was felt that a probation period of at least a year should elapse before the responsibility of his business should be returned to him. This was unfortunate, as circumstances necessitated his returning to his former environment, where he lived by himself and put in his time around his place of business where he felt frustrated. He was interviewed at weekly intervals with no apparent personality change; but some evidence indicating the above situation was elicited. On April 11, he apparently felt his situation impossible and committed suicide.

Comment.—I feel that if this patient had been given fever and penicillin therapy when first observed that the above tragedy might not have occurred.

CASE 3

L.C., aged 55. This man was diagnosed as a tabetic; but presented a negative cerebrospinal fluid and a negative blood Wassermann. There was some evidence of

paretic involvement. His chief complaints were intractable lightning pains. 5,000,000 units of penicillin therapy did not afford any relief and a month later it was thought advisable to administer fever therapy, which was completed November 8, 1948, to a total of 69 hrs. at 105° F. Since the instigation of fever therapy, he has improved mentally, and although he has an occasional twinge, the so-called "lightning" pains are practically under control. In addition there is an improvement in his gait.

In view of these experiences, for in-patients at the London Clinic, we give penicillin alone, intramuscularly, in dosages varying from 6,000,000 to 10,000,000 units in individual doses of 50,000 units at 3 hour intervals, over a period of from 2 to 3 weeks, in asymptomatic neurosyphilis, meningovascular, cerebrovascular and gummatous involvement of the central nervous system. In out-patient ambulatory patients, we have arbitrarily been using 3 intramuscular injections weekly of 600,000 units dosage of procaine penicillin, to a total of 12,000,000 units. If there is no clinical improvement and serological investigation does not reveal that the process has been definitely checked, fever therapy is instituted, and, in addition, chemotherapy, consisting of further penicillin and tryparsamide or aldarson with heavy metals may be included.

In dealing with paresis, tabes dorsalis or tabo paresis, Erb's spastic paralysis or optic atrophy, *penicillin plus fever therapy* is combined from the first. We do not feel that fever therapy should be administered in reduced amounts as suggested by Solomon.⁷ In these cases, six to 10 million units of penicillin, combined with 70 hours of artificial fever therapy at 105° F., is the routine practice. In most cases where the disease is not too advanced, the patients are treated on an ambulatory basis, returning at weekly intervals for successive treatments (usually from 10 to 12). During the initial investigation period penicillin is commenced and is continued during the active treatment period, in the cabinet, and subsequently to the total dosage designated. The patient then returns to his home for employment in the midweek interval, until the course is completed. The use of electroshock treatments to initially acquire the co-operation of an agitated patient would seem to be of value. This procedure has been used on occasion.

During the past ten years, 200 patients, made up of all varieties of neurosyphilitics, have received artificial fever therapy; 40% were of the paretic type, comprising a total of 11,500 hours, averaging 56½ hours a patient. In this group,

3 deaths have occurred, directly or indirectly attributable to fever therapy. Considering the range of ages from 8 to 65 years, and the seriousness of the disease treated, combined with the natural vascular degenerative processes which occurs in the older age group, the associated risk does not seem to be prohibitive. Repeated efforts are being made to procure follow-ups on the patients treated, who, for the most part, are referred from many distant points. When possible, spinal fluid examinations are obtained every six months for two years following therapy, and then at yearly intervals, until the disease is considered definitely under control.

Lumbar tap is the routine method for obtaining spinal fluid. Cisternal puncture however is utilized where the patient becomes apprehensive, by repeated post-puncture headaches or backaches. This is a useful procedure in an out-patient clinic, where some patients refuse to co-operate, owing to hearsay. Headaches and backaches do not occur.

Prior to fever therapy, a complete physical and laboratory examination is carried out, including x-ray and electrocardiogram. The services of the consulting medical staff of Victoria Hospital, including a psychiatric opinion are freely utilized for the purpose of acquiring the best clinical evaluation of his ability to withstand the rigours of therapy and the truest picture of the neurological involvement. The cases are selected for fever on the basis of their ability to withstand the ordeal, and in borderline cases, one does not hesitate to weigh the associated danger against the dismal outcome of a rapidly progressing case. This decision is not unlike that of a surgeon who accepts the hazards of an operation to save an otherwise hopeless case.

No effort will be made here to evaluate the findings on a statistical basis. The results of therapy are reflected to not a little degree in the continued decline in the number of admissions of neurosyphilitic patients to the Ontario Hospital in the London district.

Treatment reactions.—A recapitulation in this paper of the reactions encountered in the use of heavy metals and arsenicals does not seem to be advisable, as this should be common knowledge. The reactions and complications occurring in the course of the actual fevering of the patients is the particular responsibility of the attending personnel.

The present establishment of penicillin as the drug par excellence, in the treatment of neurosyphilis, focuses attention at the moment on the possible reactions encountered in its usage. Certainly penicillin alone is the least hazardous of all these drugs. The reactions have been classified⁸ briefly: (1) Primary irritant. (2) Therapeutic shock. (3) Allergic manifestations.

The Jarisch-Herxheimer reaction may be focal or systemic and symptoms will usually subside in 24 to 48 hours. In central nervous system involvement, these symptoms may be avoided by low initial doses of the drug. This is particularly applicable when complicated by cardiovascular involvement. The following reactions¹¹ are reported, exacerbation of psychosis, convulsions, transverse myelitis, mania, hallucinations, lightning pains, rapid parietic deterioration, progressing to death and progression of tabetic primary atrophy to blindness.

At the present time, apart from therapeutic shock, the greatest number of penicillin reactions⁸ will fall under the "allergic" classifications. Sensitivity may appear immediately or after a latent period. Sensitivity may be acquired through exposure to penicillin; but a few may be spontaneously susceptible. The acquired form is analogous to drug or serum sickness and reactions are sometimes characterized by resemblance to delayed serum sickness. If a bullous eruption or eczematous id appear, extreme caution should be exercised in further treatment.

Lamb⁹ has recommended that each patient be questioned as to a history of allergy and previous penicillin sensitivity and trichophytosis, or other infections. Allergic reactions respond frequently to the withdrawal of the drug, to cold applications and to the use of anti-histamine drug.

SUMMARY AND CONCLUSIONS

Penicillin is the modern drug of choice in the treatment of neurosyphilis, because of its low toxicity and high therapeutic effect. The results of therapy are apparently equal to and often may exceed other methods of chemotherapy. It is undoubtedly the least hazardous of the drugs. A course of 10,000,000 to 12,000,000 units alone, administered over a period of two to three weeks, is in most cases sufficient in the

management of asymptomatic neurosyphilis, acute syphilitic meningitis, meningovascular and cerebrovascular lues or gumma. The gauge of progress in treatment should be the serological reversal of active manifestations as indicated by the cell count, total protein, colloidal gold and complement fixation tests. Failure to respond, however, as indicated by the onset of symptoms, or lack of serological improvement within six months to one year, should necessitate a repetition of penicillin preferably combined with fever therapy.

The present day enthusiasm for the use of penicillin alone as the ideal therapy based on the spectacular response of the spinal fluid serology is not entirely warranted. In spite of serological arrest of activity, the patient who does not show symptomatic improvement should have the additional effect of fever therapy, combined with penicillin and possibly the addition of an arsenical. We must not lose sight, as clinicians, of our responsibility to the individual in such cases.

Attention is directed to the possibility of reactions encountered in the use of penicillin in neurosyphilis.

Several years of observation will be required to see the ultimate effects of penicillin alone in asymptomatic neurosyphilis. Confused reports as to its efficacy, in comparison with fever therapy alone, or combined with fever therapy, in the treatment of symptomatic neurosyphilis are permeating the literature.

It would seem that until the results of penicillin therapy alone are evaluated in the course of time, that penicillin, plus fever therapy, and, in selected cases, arsenicals and heavy metals, should still be the choice of treatment of advanced or resistant neurosyphilis.

REFERENCES

1. DATTNER, B., KAUFMAN, S. S. AND THOMAS, E. W.: *Arch. Neurol. & Psychiat.*, 58: 426, 1947.
2. CURTIS, H. C.: *Am. J. Syph., Gonorr. & Ven. Dis.*, 31: 618, 1947.
3. O'LEARY, P.: *M. Clin. North America*, p. 895, July, 1946.
4. EAGLE, H., MAGNUSON, H. J. AND FLEISCHMAN, R.: *Bull. Johns Hopkins Hosp.*, 79: 163, 1946.
5. REYNOLDS, F. W., MOHR, C. F. AND MOORE, J. E.: *J. A. M. A.*, 131: 1255, 1946.
6. STOKES, J. H., STEIGNER, H. P. AND GAMMON, G. D.: *Am. J. Syph., Gonorr. & Ven. Dis.*, 32: 28, 1948.
7. SOLOMON, H. C.: *Am. J. Med.*, 5: 712, 1948.
8. MORGINSON, W. J.: *J. A. M. A.*, 132: 915, 1946.
9. LAMB, J. H.: *Arch. Dermat. & Syph.*, 52: 93, 1945.
10. SEXTON, G. B.: *Canad. M. A. J.*, 54: 56, 1946.
11. The Status of Penicillin in the Treatment of Syphilis. Syphilis Study Section, National Institute of Health. Council on Pharmacy and Chemistry, U.S. Public Health Service, December 1, 1947.

455 Waterloo St.

TREATMENT OF ACNE VULGARIS***J. F. Burgess, M.D., F.R.C.P.[C.]****Montreal, Que.*

ACNE is a disease of the pilo-sebaceous system resulting in the formation of comedones, which may be followed by the occurrence of follicular pustules, inflammatory nodules, abscesses or purulent cysts. The face, back and chest are the most commonly involved areas, but occasionally evidences of this process may be distributed over the body, buttocks and thighs, where the sebaceous glands are commonly plentiful and well-developed. The scalp and other areas where coarse hair normally abounds are not affected in this process, although in these, sebaceous activity is normally marked; the reason for this state is not understood.

The common clinical types of the disease may be summarized briefly as follows: (1) Superficial papulo-pustular acne. (2) Acne indurata. (3) Acne cystica in which many of the lesions contain sero-gelatinous pus. (4) Acne conglobata, a severe form involving the face, back, axillæ and buttocks, where deep scarring and interlacing abscess formation go hand in hand. (5) Acne of the nape of the neck, where furuncular and sclerosing lesions present themselves. In this condition there are nearly always two or more hairs arising from each follicle.

In acne artificialis, external agents such as paraffin oil or substances containing iodine, bromine or chlorine act as follicular irritants to produce an acneiform folliculitis usually in exposed areas, but this condition is often an occupational hazard. Sulzberger, Rostenberg and Sher¹ emphasize the affinity that exists between the halogens, oils and tar, and the pilo-sebaceous appendages and the peculiar hypersensitivity of some individuals in this regard. The basic underlying factors here do not conform with fundamental considerations in acne vulgaris.

Hormonal causes.—Barber,² in an excellent survey of the influence of sex hormones on the skin and pilo-sebaceous system sheds a great deal of light on the etiology of acne and sebaceous manifestations in general. A knowl-

edge of the effect of the androgens and œstrogens respectively in the skin and pilo-sebaceous system is essential. Two important factors are paramount, namely, the ratio existing in the individual between these two hormones and the response of the sebaceous system to these hormonal influences. Lawrence and Werthesen³ in their study of the excretion of œstrogen and androgen in the urine of eight normal women and eight female patients with acne, found a decrease from the normal in the excretion of urinary œstrogen by those with acne and no significant change in the excretion of androgen. The androgen-œstrogen ratio is the significant etiological factor in acne. Wile and his co-workers⁴ found in their studies that there was a moderate increased excretion of androgen and at the same time diminished œstrogen output in acne patients of both sexes. The pilo-sebaceous apparatus is peculiarly susceptible to androgenic stimulation which produces hyperkeratosis of their ostia and seborrhœa. On the other hand, œstrogenic stimulation diminished keratinization and activity of the sebaceous glands. Ovarian insufficiency in girls does not seem to be a factor.

In the female, large doses of testosterone propionate produces acne and hirsuties, apart from other changes in the vagina and endometrium. Hamilton⁵ has pointed out that with testosterone treatment of eunuchs, eunuchoids and adult castrates, the first effect is an oiliness of the skin and then formation of comedones about the nose, spreading to other areas such as the back and chest. The androgens are derived from the gonads in the male and largely from the adrenal gland in the females. There is a rise in the excretion of 17-ketosteroids at the time of puberty in the female, indicating increased adrenal activity that accompanies that of the ovaries. A further correlation is seen between the development of coarse hair and comedones at the menopause and in cases of virilism due to adrenal hyperplasia, in pituitary basophilism and sexual precocity in males. Barber points out, in agreement with Bloch, that the incidence and severity of acne is greater in boys than in girls.

Barber² has thrown further light on the effect of œstrogens in the seborrhœic male. He notes (1) the activity of the sebaceous gland is remarkably diminished. (2) The pilo-sebaceous orifices are reduced in size and are no longer

* Read before the Eightieth Annual Meeting of the Canadian Medical Association, Section of Dermatology, Saskatoon, June 16, 1949.

visible to the naked eye. (3) The skin becomes smooth and hypertrophy of the stratum corneum disappears. (4) The comedones shrivel and eventually disappear. (5) The pustules, and the indurated and cystic lesions gradually involute. (6) The coarse hair on the face diminishes in vigour.

It would therefore appear that in the treatment of acne in either sex, testosterone is not beneficial or may aggravate the process, apart from other deleterious and undesirable effects in the male or female individual. Oestrogenic therapy has been of value in my hands, particularly where thyroid administration is poorly tolerated or is not beneficial, and Goeckermann^{16a} has been impressed by its use in the female in moderate doses given over relatively long periods of time. Andrews^{16b} found that progesterone therapy was of real value in the treatment of semi-cystic acne in males. He has been further impressed by the use of moderate doses of sulfa medication (sulfapyridine) or antibiotics combined with stilboesterol (1/4 mgm.) daily in this type of case. The use of oestrogen creams has been advocated but in different results have been obtained.

Thyroid in the treatment of many cases of acne of different types has proved of value. Constipation, fatigability, anaemia and menstrual derangements are often concomitants; these are also symptoms of hypothyroidism, a disease characterized by lipaemia (Sutton⁶). Most patients may give clinical evidence of mild hypothyroidism and experience shows that thyroid is extremely well tolerated generally by the acne patient. Basal metabolic rates may be misleading and are not helpful. Oestrogenic therapy in small doses combined with thyroid medication is valuable, where well tolerated, in the treatment of some cases in the male and female.

Vitamin deficiencies.—It is difficult to assess the factor of any vitamin deficiency in causation of acne. Vitamin A deficiency produces follicular hyperkeratotic lesions notably on the arms and legs, but in vitamin A deficiency, acne vulgaris appears with noteworthy rarity (Lowenthal⁷). Some observers believe it to be of value in the treatment of acne when combined with other measures. Straumfjord⁸ in a series of 100 cases, giving 10,000 units of vitamin A daily, and no other treatment, was able to cure 35% of his cases. Stokes and

Strenberg⁹ lay stress on the importance of water balance. Deficiency of vitamin B tends to produce fluid retention and this is probably a factor in the inflammatory processes which invade the pilo-sebaceous apparatus in the acne patient. They emphasize the value of vitamin B complex and liver injections in the treatment of acne. Joliffe *et al.*¹⁰ were able to demonstrate good results through the daily administration of 20 mgm. pyridoxine. Simpson, Ellis and Kirby Smith,¹¹ following administration of vitamin D (20,000 units daily) were not able to demonstrate important values in the treatment of a series of cases of acne. However, it has seemed to me that using larger doses (100,000 to 150,000 units daily) for a relatively short time, I have been impressed with the response to therapy in some cases, notably in acne indurata and acne conglobata. It is a fact that exposure to sunlight or daily ultraviolet light baths where no change in environment occurs is of excellent value in the treatment of acne, albeit at times temporary. Barber² points out that the cells of the rete malpighii are rich in cholesterol, which is probably not only the parent substance of vitamin D and the cholic acids of bile but the hormones and other steroids of the adrenal cortex and gonads (Cameron¹²). Silverstein, Fellner and Engel¹³ in 1932 claimed to have demonstrated the intracutaneous formation and liberation of an oestrogenic substance as a response to irradiation of the skin.

Dietary factors.—That diet plays an important rôle in the course of acne cannot be doubted. Excessive carbohydrate tends to disturb water balance and favours cutaneous hydration, as stressed by Stokes and Strenberg,⁹ and Barber² favours the restriction of concentrated carbohydrate foodstuffs. However, Crawford and Schwartz¹⁴ giving carbohydrate by mouth and by intravenous injection were able to improve acne rather than aggravate it. Sutton,⁶ on the other hand, states that in conjunction with other treatment, a moderately low fat diet is of value. The factor of allergy in its relation to food ingestion does not seem to play any rôle in the management of acne. However, clinical experience has borne out the fact that most cases of acne are aggravated by chocolate, nut oils and perhaps pork fat. Other foods in exceptional cases may light up inflammatory pro-

cesses in the acne patient. It is wise, however, to restrict as little as possible the dietary intake of the adolescent.

Psychogenic factors do not appear to play any rôle as causes. Cohen¹⁵ using the mosaic test in a series of 60 acne patients and 30 normal controls could demonstrate no significant differences in the two groups. Any psychogenic factors found were not thought to be of etiological importance. However, the presence of disfiguring acne of lesser or greater degree in some individuals tends to undermine confidence and lower morale.

Local treatment.—The local treatment of acne is important and much may be done as an office procedure. Sulphur has long been recognized as of value in the local treatment of follicular infections and the use of sulphur applications, such as lotio alba, is of value. At times, a strong sulphur paste such as 30% sulphur ointment is also of value. "Intraderm sulphur" applications have been found to be useful (McKee *et al.*¹⁶). Small and large abscesses may be opened with a cataract knife followed by gentle pressure, which process leaves no scarring. Comedones may be removed with a comedone expressor and even where x-ray treatment is given this procedure is worthwhile. Peeling lotions such as 6 to 12% salicylic acid in alcohol, rubbed in with vigour, is helpful, or this effect may be obtained by an erythema dose of ultra-violet light. The use of "slush" methods (CO₂ snow) in peeling the skin to ameliorate marked scarring is of doubtful permanent value.

Over many years, x-ray treatment of acne, when combined with other measures, has been of great value. This is given in fractional doses, weekly, over the affected areas with the idea of a gradual inhibition of sebaceous secretion or partial destruction of the sebaceous gland without damage to the overlying skin. Many cases respond to other treatment without the need of such therapy. In selected cases, treatment consisting of 75-r unfiltered radiation once weekly may be given, up to sixteen exposures, combined with the other rational therapy. It is unwise to rely on x-ray therapy alone. Many patients, particularly those with fair skins, will tolerate only a fraction of the above dosage. Acne indurata probably responds best to such treatment, whereas the

mild superficial papulopustular acne responds rather poorly. Where adequate x-ray treatment has been given, cure results in about 75% of cases and the remainder may require further treatment after four months have elapsed, either because of a partial response only or because of recurrence of the condition.

GENERAL SUMMARY

Adequate rest is necessary and insufficient rest will sometimes offset other forms of therapy. Local treatment combined with minor surgical procedures should be practised. Although basic fundamental reasons exist, as outlined above, for the belief that sex hormone relationships are causative factors, treatment with female sex hormones should be used with caution. Desiccated thyroid 1 to 1½ grains daily, unless poorly tolerated, is of real value in many cases. Various vitamins, such as vitamin A, vitamin B complex and vitamin D may be used in conjunction with other therapy and have shown good, if inconclusive values, at times. Dietary restrictions, notably chocolate, nut oils and pork fat, are advocated and in exceptional cases, further fat or carbohydrate restrictions may be indicated. X-ray treatment may be given in selected cases and has over many years proved its worth. It is a fact that relatively fewer cases are considered to need x-ray treatment today than were treated in similar fashion some years ago.

REFERENCES

1. SULZBERGER, M. B., ROSTENBERG, M. B. AND SHER, J. J.: *N.Y. State J. Med.*, 34: 1, 1934.
2. BARBER, H. W.: *Modern Trends in Dermatology*. Butterworth & Co.
3. LAWRENCE, C. H. AND WERTHESEN, N. T.: *Endocrinology*, 27: 755, 1940.
4. WILE, U. J., BARNEY, F. B. AND BRADBURY, J. T.: *Arch. Dermat. & Syph.*, 39: 195, 1939.
5. HAMILTON, J. B.: *J. Clin. Endocrinol.*, 1: 570, 1941.
6. SUTTON, R. L. AND SUTTON, R. L. JR.: *Handbook of Diseases of the Skin*, C. V. Mosby, 1949.
7. LOWENTHAL, L. J. A.: *Arch. Dermat. & Syph.*, 28: 700, 1933.
8. STRAUMFJORD, J. U.: *Northwest Med.*, 42: 219, 1943.
9. STOKES, J. H. AND STRENNBERG, T. A.: *Arch. Dermatol. & Syph.*, 40: 345, 1939.
10. JOLIFFE, N., ROSENBLUM, L. A. AND SAVILLE, J.: *J. Invest. Dermatol.*, 5: 143, 1942.
11. SIMPSON, C. A., ELLIS, F. A. AND KIRBY-SMITH, H.: *Arch. Dermatol. & Syph.*, 41: 835, 1940.
12. CAMERON, A. T.: *Recent Advances in Endocrinology*. Churchill, London, 1945.
13. SILVERSTEIN, F., FELLNER, C. O. AND ENGEL, P.: *Z. Krebsforsch.*, 35: 420, 1932.
14. CRAWFORD, G. M. AND SCHWARTZ, J. H.: *Arch. Dermat. & Syph.*, 33: 1034, 1936.
15. COHEN, E. L.: *Brit. J. Dermat.*, 57: 10, 1945.
16. MCKEE, G. M., WACHTEL, J., KARP, F. L. AND HERMANN, F.: *J. Invest. Dermatol.*, 6: 309, 1945.
(a) GOECKERMAN, W. H.: Personal communication.
(b) ANDREWS, G. C.: Personal communication.

906 Drummond Medical Bldg.

RÉSUMÉ

L'auteur après avoir donné une définition et une division de l'acné, nous soumet les formes de traitement les plus employées tout en se basant sur l'étiologie. (1) Les cause hormonales: les estrogènes sont diminués chez tous les patients faisant de l'acné et leur emploi thérapeutique est indiqué dans certaines formes. Les extraits thyroïdiens employés conjointement ont aussi leur place. (2) Avitaminoses: de fortes doses de vitamines A, B, D, donnent des résultats inconstants. (3) Facteurs alimentaires: l'auteur conseille des restrictions dans l'usage du chocolat et de certaines huiles. Dans d'autres cas il faut aussi diminuer les graisses et les hydrates de carbone. (4) Traitement local: le soufre et les rayons-x ont encore une valeur reconnue.

YVES PRÉVOST

ECTOPIC PREGNANCY*

E. H. McFadyen, M.D., F.A.C.S.

Saskatoon, Sask.

ONE is aware that nearly everything there is to be said about ectopic pregnancy has been said many times before, but it is only by repetition that we become ectopic conscious, and thus reduce the errors in diagnosis and the mortality. A good rule to follow is; "every woman of child-bearing age who has a pain in her abdomen is a possible ectopic pregnancy".

That ectopic pregnancy is a problem in diagnosis is shown by the statistics from the New York Hospital for the period 1931 to 1940. During this period there were 141 proved ectopic pregnancies with a correct preoperative diagnosis in 124 cases. However, during this period there were 45 laparotomies done for a supposed ectopic, in which the diagnosis was in error, but we might also point out that in only 7 of these cases was operation deemed unnecessary. Also, one notes that during the latter part of this time there was a great deal written about the subject and that subsequently the percentage of error became much lower.

To further stress the importance of this condition as a problem in diagnosis one need only analyze the 101 deaths due to ectopic pregnancy in Philadelphia, 1931 to 1943. In these 101 deaths the main factors were; failure of diagnosis, delay in operation, inadequate treatment and poor surgical judgment.

* Read before the Eightieth Annual Meeting of the Canadian Medical Association, Section of Obstetrics and Gynecology, Saskatoon, June 16, 1949.

Etiology.—Although the actual etiology of a large number of cases is obscure and a definite proof of cause is often lacking, there are certain factors which do occur rather frequently. These are; sterility of the one or two child type (low fertility), previous tubal disease and previous pelvic surgery, not forgetting a previous sterilization. When one finds one or more of the above factors in the history of a woman who is complaining of lower abdominal pain, one should be on the alert for an ectopic pregnancy.

Age.—As previously mentioned this is a condition of the child bearing age. Most cases occur between the ages of 25 to 35 but one must not overlook the possibility in the teens and in the forties. I have seen a case in a 15-year old girl and another in a 44-year old woman.

Types.—There are four common types. (a) Unruptured. (b) Tubal abortion. (c) Typical ruptured. (d) Atypical ruptured.

COMMON FEATURES

1. **Menstruation.**—In over 90% of cases there is a history of amenorrhœa. This may vary from a few days to weeks. Some may deny amenorrhœa but in these a careful history will show that their last period was very atypical. When flow does start it may vary from a spotting to the quantity of a normal period. It is usually darker in colour than normal menstrual flow. In 30% of cases pain precedes bleeding, in 50% they seem to occur simultaneously, while in the other 20% bleeding precedes pain.

2. **Pain.**—Pain is common to nearly all ectopic pregnancies but as it varies in the different types it will be considered separately.

3. **Fainting.**—Fainting occurs in about 25% of cases and when it occurs in conjunction with other symptoms it is almost diagnostic.

4. **Pregnancy symptoms.**—Such as nausea and/or vomiting, tingling breasts, etc., may or may not be present.

5. **Physical findings.**—A somewhat softened and bluish cervix and a slightly enlarged uterus may or may not be present.

6. **Aschheim-Zondek or Friedman tests** may or may not be positive. In very early cases a number of false negatives will be obtained. If the pregnancy is far enough advanced to give a positive reaction, the test will remain positive for approximately a week after death of the fetus.

LIBRARY

BOSTON UNIVERSITY
SCHOOL OF MEDICINE

7. *Cullen's sign*.—Blue navel. Is rarely found but if present it indicates intraperitoneal hæmorrhage.

A. *Unruptured ectopic*: is a diagnosis not often attempted in that it is a very early phase of the pregnancy and the symptoms are usually not severe enough to cause the patient to seek medical aid. The patient usually comes in complaining of a short period of amenorrhœa followed by some vaginal spotting. This is accompanied by some crampy lower abdominal pain. Some tenderness is elicited on palpation and there may be a rather sharp pain on moving the cervix. It is here that the culdoscope has its greatest use. It is my opinion that a culdoscopic or peritoneoscopic examination provides the only means by which one can make a diagnosis with any degree of assurance.

The two conditions most commonly confused with unruptured ectopic pregnancy are normal pregnancy and threatened abortion, and as previously stated I know of no means of being certain other than visualization.

B. *Tubal abortion*: often referred to as external rupture. It is believed that this condition occurs much more frequently than is recorded, due to the symptoms not being severe enough or prolonged enough to cause the patient to call her doctor. The menstrual history is that common to ectopic pregnancies. The pattern of pain is that of crampy lower abdominal pain followed by a short, but severe episode. The general discomfort is directly proportional to the amount of blood spilled into the peritoneal cavity.

There is usually a marked degree of tenderness across the lower abdomen, although this may be localized at other points, frequently in the epigastrium. In most cases there will be a marked increase in pain on moving the cervix. Immediately following the accident there will be a mild leucocytosis and a slight elevation of temperature. There may be some frequency of urination, although the urinalysis will be negative. As these are early cases the Aschheim-Zondek test is unreliable.

These patients should be hospitalized for a period of observation and a supply of compatible blood kept ready in case of severe hæmorrhage. In the majority of cases the patients will be greatly improved within 24 hours and the leucocytosis and temperature will subside. However, a few will continue to bleed and the symptoms of peritoneal irritation will

increase. In these cases a colpotomy may be done and if blood is obtained from the cul-de-sac operation is indicated. Others will have a severe hæmorrhage and in these cases immediate transfusion followed by operation is indicated. If the condition subsides without interference one should have the patient return for examination at regular intervals and if there is menstrual irregularity or amenorrhœa an Aschheim-Zondek test should be done, as the majority of abdominal pregnancies result from tubal abortions.

C. *Typical ruptured ectopic*: should cause the least trouble in diagnosis and yet it is from this group that the most fatalities occur. The menstrual history is typical. There is usually some crampy pain in the lower abdomen followed by a severe pain of the tubal rupture. There may be shoulder pain and one should always question the patient about fainting.

If the patient is seen very shortly after the initial bout of severe pain she will be in a state of shock—blanched, sighing respirations, rapid pulse and with a definite fall in blood pressure. If a variable interval of time has elapsed before the patient is seen the initial shock may have passed, however, where a large vessel has been torn, usually in the interstitial type, the patient will continue to bleed severely and immediate treatment is demanded. Abdominal examination will reveal acute rebound tenderness with accentuation in the lower quadrants, if the patient is seen shortly after the rupture, but this will be less acute if the abdomen is distended with blood. The patient steadfastly refuses to move because of the severe pain this causes here. Pelvic examination elicits severe pain on the affected side on movement of the cervix. There will be a boggy mass in the fornices and cul-de-sac. A mass is not often palpated.

The patient should be immediately hospitalized and plasma given while suitable blood is being obtained, but remember that plasma is in no way a substitute for whole blood in cases of severe hæmorrhage. In obtaining blood for these cases one must be sure of adequate quantities. If a large vessel is torn one may have to transfuse the patient through several portals in order to gain on the loss. As soon as it is deemed safe the patient should be operated on, but not before. Remember the old saying of "put a patient on the operating table and

take her off colder" is a very true one. These patients should also be transfused postoperatively to prevent vital tissue damage from ischæmia.

There is, I think, very little to be said about differential diagnosis in typical cases. The patient is obviously suffering from an intraperitoneal hæmorrhage and this combined with the history and physical findings should make the diagnosis relatively clear. The most common cause of intraperitoneal hæmorrhage is a ruptured ectopic pregnancy. In these cases if we act as we should for hæmorrhage—treat the shock and stop the bleeding—and worried less about differentiating the cause there would be less deaths.

D. Atypical ruptured ectopic.—This refers to the cases where, instead of proceeding along a typical course, the bleeding is slight or becomes sealed off and there is no indication for emergency surgery. Often these cases are not seen for some time after the acute episode and diagnosis may be most difficult.

The menstrual history is that of any ectopic pregnancy except that when seen, the patient may have been bleeding slightly or intermittently for some time. If one can obtain a clear history it will usually be found that there has been some crampy, lower abdominal pain followed by a rather acute episode, which in turn is followed by a moderately severe almost continuous pain with acute cramp-like exacerbations. In a number of these cases the patient does not wish to admit the possibility of pregnancy and it is most difficult to get a helpful history.

In taking the history one must always keep the secondary causation in mind. There can be a partial rupture of the tube which will give a severe bout of pain but which will not produce a large intraperitoneal hæmorrhage. These will often bleed interstitially, causing a large tubal mass which will be very painful and which will probably become adherent to surrounding structures. The second possibility has much the same ending but in these cases there has been a large intraperitoneal hæmorrhage and when the blood pressure fell the bleeding stopped and the bleeding point became thrombosed. Leff and Winson quote a case admitted in shock, to whom they gave five blood transfusions and her progress was so good they did not operate, however, six months

later she was admitted and operated on for a fibroid which proved to be an old walled-off ectopic pregnancy, adherent to the uterus.

The third type, which produces a small continuous hæmorrhage into the abdomen has the same ending.

The physical examination reveals some generalized abdominal tenderness which is greatly accentuated in the lower quadrants. There is extreme pain on moving the cervix and a tubal mass is palpated. The patient may be so tender as to render pelvic examination unsatisfactory; in these cases examination under anaesthesia is indicated.

The value of laboratory work depends on the length of time symptoms have been present. If less than a week the Aschheim-Zondek test may still be positive and the white blood count and sedimentation rate will not be high. If the case has been prolonged the Aschheim-Zondek test will be negative and the white blood count and sedimentation rate will be increased. There is nearly always a secondary anæmia.

For further investigation one should do a pelvic examination under anaesthesia and at this time, if the mass is not in the cul-de-sac, a colpotomy may be done to determine the presence or absence of old blood in the peritoneal cavity. A culdoscopic or peritoneoscopic examination is generally not indicated in these cases.

Differential diagnosis of atypical cases. It is not my intention to discuss every condition which could enter into the differential. There are two conditions which form 90% of the problems and these will be discussed.

(a) Pelvic inflammatory disease with a definite tubal mass creates a major obstacle in correct diagnosis. If one will go over the history carefully right from the beginning it will point away from this condition, especially if one obtains a history of a period of amenorrhœa. In pelvic inflammatory disease there are often bilateral masses, the temperature and the white blood count are higher, the Aschheim-Zondek test is negative, there is not the irregularity of menses and there is no blood in the cul-de-sac.

(b) Incomplete abortion; also presents a rather difficult problem at times. Here the bleeding is usually heavier and of brighter colour. There is no pelvic mass, no blood in the cul-de-sac, the history of pain is different

and there is usually not the high temperature or elevated blood count, unless of course there has been interference. If after considering all of these points there is still doubt between these two diagnosis a dilatation and curettage is indicated. If it is an ectopic pregnancy there may be decidual tissue but no villi.

Time does not permit us to go into the rare types of cases such as simultaneous ectopic and intrauterine pregnancy or ectopic pregnancy where there has been an attempt at abortion or the many other possibilities of ectopic pregnancy. In these cases one must be thorough and then make use of that indefinable factor called surgical judgment.

In summarizing the atypical cases one can only say that if the history and the physical findings point to ectopic pregnancy and no other diagnosis can definitely be made, a laparotomy is justified. If this rule is followed one will find the diagnosis correct in at least 75% of cases.

Treatment.—First, if the patients are bleeding, they must be adequately transfused. Secondly they must be operated on. The analysis of the deaths in Philadelphia shows that a large number of these deaths were caused either by inadequate surgery or by some added surgery such as appendectomy or myomectomy. Do adequate surgery for the condition at hand but no more.

CONCLUSIONS

A good history is still the most important item in diagnosis. Accentuated pain on moving the cervix should never be overlooked. Think of ectopic pregnancy in the child bearing age. If the patient is in shock, treat the shock and think about diagnosis and further treatment later. Surgical treatment should be adequate and limited.

REFERENCES

1. MARCHETTI, A. A., KUDER, K. AND KUDER, A.: *Am. J. Obst. & Gyn.*, 52: 544, 1946.
2. WILLIAMS, P. AND CORBITT, J. D.: *Am. J. Obst. & Gyn.*, 48: 841, 1944.
3. TITUS, P.: *Management of Obstetrical Difficulties*, The C. V. Mosby Co., St. Louis, 1937.
4. LEFF, B. AND WINSON, S. G.: *Am. J. Obst. & Gyn.*, 53: 296, 1947.
5. FINE, J., FRANK, H. A. AND SELIGMAN, A. M.: *Ann. Surg.*, 122: 652, 1945.
6. BURCH, L. E. AND SEITCHIK, J.: *Am. J. Obst. & Gyn.*, 50: 765, 1945.
7. LANGMAN, L. AND GOLDBLATT, M.: *Surg., Gynec. & Obst.*, 69: 65, 1939.
8. DILL, L. V.: *Surg. Clin. N. Am.*, 29: 595, 1949.
9. DECKER, A.: *Third American Congress Obst. & Gyn.*, page 358.

303 McMillan Bldg.

LARYNGEAL VS. GASTRIC CULTURES IN THE DETECTION OF TUBERCLE BACILLI

M. Duggan, M.R.C.S., L.R.C.P.* and
Laura Delamater, R.T.†

Brandon, Man.

SO far as we are aware, little attention has been paid in this country to the use of laryngeal swabs in the diagnosis of pulmonary tuberculosis. In 1941, Nassau described a simplified method of taking laryngeal swabs and culturing them; and in 1948, two separate reports were published by Hounslow and Usher and by Forbes *et al.*, both of these comparing the laryngeal swab with the gastric culture. These reports commented favourably on the ease of taking laryngeal swabs, and also found that they were as sensitive to culture as gastric lavages.

This present study was carried out on 100 patients in the Brandon Sanatorium, which is operated for the Department of National Health, Indian Health Services, by the Sanatorium Board of Manitoba. There are under treatment here about 240 Indians and 12 Polish veterans. At the same time, a white out-patient clinic is conducted once a week. Our series was made up of 85 Indian in-patients, varying from 1 year up to 70 years, 13 white out-patients, and 2 Polish veterans who immigrated to Canada.

Our reason for doing the series is that the simplicity of laboratory technique, the time factor, and the comfort of the patient are so very much in favour of doing laryngeal swabs that, if it could be shown that they are as sensitive to culture as a gastric lavage, it would seem reasonable to substitute them for the more unpleasant and technically more difficult procedure of gastric lavage and culture.

Our own experience has shown that all the patients preferred the laryngeal swabs. Points in favour of this procedure include the ease with which infants and children can be swabbed in cases where it has been almost impossible to pass a gastric tube. Another advantage is the fact that no set time of day in relation to meals is necessary, compared to the necessity of obtaining gastric contents before break-

* Staff Physician, Brandon Sanatorium.

† Laboratory Technician, Brandon Sanatorium.

fast. For instance, no laryngeal swab in our series was taken before breakfast, but they were spread over the morning and afternoon. Out-patients especially appreciated this last feature.

As regards the time factor, owing to the ease of procedure, it is possible for one technician to take up to 12 laryngeal swabs in 20 minutes and set up the cultures in another 20 minutes, making a total of only 40 minutes; whereas 3 gastric lavages in a morning were enough for one technician to handle.

Technique.—We decided to take 3 swabs and 1 gastric lavage from each patient. The swabs were not necessarily on consecutive days, but always the 3 were obtained within 5 days. The gastric lavage was done on the day of the first swab.

Gastric wash.—The technique we use is the same as has been employed for a number of years at the Manitoba Sanatorium in Ninette, Manitoba, and is as follows:

An equal amount of 5% NaOH is mixed with the gastric contents and incubated in two sterile centrifuge tubes for 40 minutes. The first of these tubes is used for a direct examination of a smear and is treated as follows. The tube is centrifuged for 15 minutes before draining, two drops of 6% H_2SO_4 are then run down the side of the tube to neutralize the previously alkalized sediment, and the tube is again drained and two smears are then made and stained.

The second tube, to be used for culture, is at the same time centrifuged for 15 minutes, after which the supernatant fluid is drained off and a buffer solution added. This is again centrifuged for 15 minutes and drained off, after which the sediment is planted on to culture media and incubated for eight weeks before being discarded. The buffer solution is a potassium phosphate:

KH_2PO_4 (monobasic)	1.5 gm.
NaCl	3.5 gm.
N/10 H_2SO_4	20 c.c.
Distilled H_2O	4,000 c.c.

Laryngeal swab and culture. — We made the swabs ourselves as follows: each one consists of a piece of baling wire about 11 inches long. One end is twisted to make a handle and the other end is bent to form a small hook upon which non-absorbent cotton wool is firmly wound and tied to form the swab. Non-

absorbent cotton wool is essential to prevent excessive absorption of acid, and it must be very firmly secured to the wire to prevent the vocal cords from gripping and retaining the swab! About $1\frac{1}{4}$ inches from the swab end, the wire is curved to an angle of 90° . The swabs are then wrapped separately in brown paper and sterilized in a dry heat oven.

The swabs may be taken by direct vision, using a laryngeal mirror, or blindly. We used the blind method, as it is easier for laboratory technicians to learn. The patient is seated opposite the operator, who is suitably protected by a mask and a bronchoscopic glass head shield. The patient's tongue is held forward in a gauze strip by the operator's left hand. The swab, held in the right hand, is then dipped in sterile water and slipped over the back of the tongue, making sure it is behind the epiglottis, and so down into the larynx. At this point, the patient invariably coughs explosively on to the swab as it is quickly scraped over and around the cords. The swab is then withdrawn, the whole procedure having taken about 15 seconds. The violent cough produced is frequently sufficient for the epiglottis to be brought into view, and the position of the swab is thus checked.

After withdrawing the swab, the wire is straightened manually with sterile gauze and placed in a sterile tube. We use small 30 c.c. glass cylinders. This tube is plugged with sterile cotton wool until treated, which is usually within an hour.

To treat it, the cylinder is filled with 6% H_2SO_4 and allowed to stand for 10 minutes. The acid is then drained off and 1.2 c.c. of 5% NaOH is added. After 30 seconds, the tube is filled with sterile water to which a trace of methyl red has been added as an indicator. Owing to residual H_2SO_4 on the side of the tube, the reaction often remains slightly acid, so that it is necessary to add a little more of the 5% NaOH drop by drop until the solution is neutral or slightly alkaline. The swab is now left in the solution for 5 minutes and then is carefully rubbed over the culture media and incubated for eight weeks.

We used "Petragnani" media throughout and examined all tubes daily for eight weeks before discarding. In practice, a weekly examination for six weeks would suffice.

RESULTS AND DISCUSSION

TABLE I.

RESULTS OF 100 CASES (1 G.C. PLUS 3 L.S. TO EACH)	
Positive to both G.C. and L.S.	27
Positive to L.S. only	5
Positive to G.C. only	3
Total positive to culture	35
G.C.—Gastric culture.	
L.S.—Laryngeal swab.	

The above table of our results shows a slight leaning in favour of laryngeal swabs, but not sufficient to be significant. Four of the above G.C. positive were positive to smear and, incidentally, positive to all three laryngeal swabs.

TABLE II.

BREAKDOWN OF THE 32 CASES (27 + 5) POSITIVE TO L.S.	
Positive to all 3 swabs	12
Positive to 2 out of 3 swabs	11
Positive to 1 out of 3 swabs	9

This table shows the necessity for taking more than one laryngeal swab from any case; a single swab being not comparable in accuracy to a gastric culture, but 2 swabs (11 + 12 = 23) or preferably 3 swabs (9 + 11 + 12 = 32) are comparable with our gastric cultures in this series (30 positives).

It is interesting to note that the average time for the gastric cultures to become positive was 21.1 days, the times varying from 13 to 34 days; and the average for the laryngeal swabs was 19.4 days, the times varying from 10 to 39 days. There was thus a slightly shorter average period of incubation for the laryngeal swabs, but not enough to be significant. In the cases of both gastric cultures and laryngeal swabs, the peak period was at three weeks.

In trying to determine the reasons for discrepancies in the two procedures, that is, the G.C. positive, L.S. negative and L.S. positive G.C. negative cases, it was found that in the 3 G.C. positive L.S. negative cases, the average culture time was 34.0 days, while in the 5 L.S. positive G.C. negative, the average time was 24 days, both of these times being appreciably higher than the average. A further point is that, of the 5 L.S. positive G.C. negative cases, 3 were positive to only one swab. These points seem to indicate that the "failures" were borderline cases, producing low concentrations of bacilli at irregular intervals.

To sum up, we took 100 consecutive routine gastric cultures and did 3 laryngeal swabs on each. Our results show that two, or preferably

three of these swabs are as accurate as a single gastric lavage and culture, and it is therefore reasonable to substitute the pleasanter and easier procedure of laryngeal swab for gastric lavage.

Our thanks are due to Dr. P. E. Moore, Director, Indian Health Services, Department of National Health and Welfare, for making available the culture media used in this series, and to Dr. E. L. Ross, Medical Director of the Sanatorium Board of Manitoba, and Dr. J. G. Fyfe, Medical Superintendent of the Brandon Sanatorium, for their help and criticism in doing this work.

BIBLIOGRAPHY

1. HOUNSLOW, A. G. AND USHER, G.: *Tubercle*, 29: February, 1948.
2. FORBES, G. B. *et al.*: *Lancet*, July 24, 1948.
3. NASSAU, E.: *Proc. Roy. Soc. Med.*, 34: 397, 1941.

THE CLINICAL VALUE OF STREPTOMYCIN RESISTANCE TESTS IN TUBERCULOSIS*

W. Anderson, M.B., Ch.B.(Edin.) and
J. D. Smith, M.D.

Weston, Ont.

THE now widespread and practically universal exhibition of streptomycin as an adjunct in the treatment of tuberculosis has carried as its inevitable concomitant, bacteriological studies into the incidence and degree of streptomycin resistance developing in the organisms isolated during and after therapy. Reports initially stemming from these studies showed that streptomycin resistance, in incidence at least, varied largely as the duration of treatment and the size of dosage employed. Investigations have shown that prior to the onset of streptomycin treatment approximately 95% of isolated strains of tubercle bacilli are sensitive to concentrations of streptomycin of less than 5 micrograms per c.c.¹

As these factors have tended to become stabilized, the incidence of streptomycin resistance, during and after streptomycin treatment, has emerged as a reasonably constant phenomenon; the remaining variables being the technical methods employed by various workers in this field and the individual and arbitrary definition of resistance.

At the Toronto Hospital for Tuberculosis investigations demonstrated the development of resistance in approximately 60 to 70% of cases

* From the Departments of Laboratories and Medicine, the Toronto Hospital for Tuberculosis, Weston, Ontario.

where the dosage was one gram daily for periods of 60 to 90 days.¹ Resistance was defined as growth in concentrations of 50 micrograms of streptomycin per c.c. on Herrold's medium*—

* HERROLD'S MEDIUM

Peptone	10 gm.
NaCl	5 gm.
Beef extract (Difco)	3 gm.
Agar	10 gm.
Distilled water up to	1,000 c.c.
pH	7.2-7.3

Pour into flasks in 150 c.c. amounts. Autoclave at 15 lb. for 15 minutes. Cool to 56° C. Add streptomycin in the desired amounts. Also at 56° C. add aseptically, one egg yolk to each flask.

the organisms having first been isolated on diagnostic Lowenstein's slopes. This level, in itself an arbitrary one, was chosen as reasonable, since it exceeded the serum levels of the drug obtained by the dosage presently employed.

While hospital laboratories continue to perform streptomycin resistance tests on *Mycobacterium tuberculosis*, there remains considerable difference of clinical opinion concerning the value of such tests as a therapeutic guide. Such opinions result, on one hand, in the cessation of further streptomycin therapy (whenever organisms acquire the power of growth in concentra-

TABLE I.
CASES "RESISTANT" AT THE COMMENCEMENT
OF A SUBSEQUENT COURSE

Case No.	Indication	No. of days	Sed. rate	Sputum	Temperature	Weight	Remarks	Final result
1	Temperature and effusion	90	112 to 28	decrease	104 to N.	n.c.	Effusion cleared	Improved
2	Effusion	90	57 to 26	—	Normal	n.c.	No radiological change	Slight improvement
3	New lesion	90	n.c.	n.c.	Normal	104 to 110	Moderate radiological clearing	Improvement
4	Spread	90	40 to 30	decrease	99.5 to 99	—	Slight radiological clearing	Improvement
5	No indication	180	15 to 18	increase	n.c.	n.c.	n.c.	Unimproved
6	Epididymitis	90	100 to 90	increase	Normal	130 to 126	n.c.	Epididymitis improved
7	Extensions	180	n.c.	n.c.	102 to N.	n.c.	Marked clearing of exudative disease	Improved
8	Spread	90	18 to 2	increase	101 to 99	—	Clearing of exudative disease. Cavity smaller	Improved
9	Laryngitis	60	44 to 36	increase	Normal	—	Laryngitis improved	Improved
10	Wound	90	n.c.	increase	n.c.	n.c.	n.c.	Unimproved
11	Laryngitis	60	40 to 6	—	Normal	—	Exudative clearing laryngitis cleared	Improved
12	No indication	180	n.c.	n.c.	101 to 100	n.c.	n.c.	Unimproved
13	Extension	90	70 to 80	n.c.	99 to 101	108 to 103	Extension	Unimproved
14	Tuberculous bronchitis. Extension	90	36 to 9	decrease	99.5 to N.	193 to 200	Slight clearing. Slight improvement of bronchitis	Improvement slight
15	No indication	180	—	n.c.	n.c.	n.c.	n.c.	Unimproved
16	Extension	42	—	0	Normal	—	n.c.	Unimproved

N.—indicates normal.

n.c.—indicates "no change".

tions of streptomycin locally accepted as indicating resistance) on the other hand, resistance tests are not held as being sufficiently important to influence the continuation of therapy over and above clinical judgment. The duration of therapy and size of dose are variously influenced by opinions held by clinical staffs concerning the relative importance of creating a predominantly resistant bacterial community.

Table I indicates the immediate therapeutic response obtained at the Toronto Hospital for Tuberculosis, Weston, Ontario; in 16 courses of

are shown, streptomycin therapy was administered for other than clinical reasons.

Table II indicates the immediate response obtained in a further 8 cases in whom similar criteria were used as an indication for the commencing of further streptomycin therapy, but in whom streptomycin resistance tests completed prior to the onset of the subsequent course showed the presence of a totally sensitive bacterial community, *i.e.*, organisms which did not grow in concentrations exceeding 2 micrograms of streptomycin per c.c.

TABLE II.
CASES "SENSITIVE" AT COMMENCEMENT OF SUBSEQUENT COURSE

No.	Indication	No. of days	Sed. rate	Sputum	Temp.	Weight	Remarks	Final result
1	Positive sputum with wheeze	90	n.c.	n.c.	Normal	—	n.c.	Unimproved
2	Tuberculous bronchitis	90	17 to 5	n.c.	Normal	n.c.	Marked radiological clearing. Not bronchoscoped	Improved
3	Tuberculous bronchitis	40	71 to 14	n.c.	n.c.	n.c.	n.c.	Improved
4	Tuberculous bronchitis of stump	60	n.c.	decrease	100 to N.	—	Symptomatic improvement	Improved
5	Spread	60	53 to 40	n.c.	99 to N.	n.c.	n.c.	Unimproved
6	Spread	56	n.c.	decrease	Normal	n.c.	Slight clearing	Slight improvement
7	Tuberculous peritonitis	65	21 to 16	0	Normal	132 to 137	Slight clinical improvement	Improved
8	Sinus	90	28 to 10	—	Normal	112 to 122	Sinus closed	Improved

n.c.—indicates "no change".

N.—indicates "normal".

streptomycin administered to patients who had previously received streptomycin for varying periods of time and in whom completed resistance tests, prior to the commencing of the subsequent course, indicated the acquisition of streptomycin resistance by the methods employed in the hospital laboratory, *i.e.*, growth of organisms at concentrations of 50 micrograms of streptomycin at least.

It is to be noted that with the exception of three cases, the clinical indications directing the use of the antibiotic were those popularly accepted as being justifiable, and further, that they in no way differed from indications now used to initiate a first course of streptomycin therapy. In the three cases where no indications

Table III summarizes the findings shown in Tables I and II, and indicates the ratio of immediate favourable response in second and subsequent courses in the two groups of patients.

TABLE III.

Group	Resistant before subsequent course	Sensitive before subsequent course
In which streptomycin was indicated.....	13	8
Showing improvement.....	8	5
Showing slight improvement.....	2	1
Showing no improvement.....	3	2

CONCLUSIONS

It is apparent from the accompanying tables that the incidence of immediate favourable clinical response was as great among those patients whose isolated organisms were streptomycin resistant prior to therapy as among those whose organisms were streptomycin sensitive. Further, clinical indications would appear to be of paramount importance in the assessment of the potential beneficial effects to be expected of streptomycin therapy.

The above incidence lends strength to the contention expressed by Armstrong and Walker² as a result of post mortem bacteriological studies on a "resistant case".

The authors wish to express their thanks to Miss M. Kaake, B.H.Sc., for her technical assistance, and the clinical staff for making clinical records available. Permission to publish these notes was obtained through the courtesy of Dr. C. A. Wicks, Superintendent, Toronto Hospital for Tuberculosis, Weston, Ontario. We also acknowledge the financial aid given in these projects by the Ontario Department of Health through the Federal Health grants.

REFERENCES

1. ANDERSON, W. AND KAAKE, M.: *Canad. M. A. J.*, 62: 59, 1950.
2. ARMSTRONG, A. R. AND WALKER, A. M.: *Canad. M. A. J.*, 60: 383, 1949.

IN VIVO DEVELOPMENT OF STREPTOMYCIN RESISTANCE BY THE TUBERCLE BACILLUS*

W. Anderson, M.B., Ch.B.(Edin.), and
Miss M. Kaake, B.H.Sc.

Weston, Ont.

THE incidence of the development of streptomycin resistance, *in vivo*, by the *Mycobacterium tuberculosis* has, since the entry of this antibiotic into the therapeutic field been variously reported as ranging over a wide scale.

These reports, far from being conflicting, merely reflect the still widely divergent views and trends associated with dosage and duration of therapy as well as the variety of laboratory methods presently being utilized to arrive at what, at the moment, is no more than an arbitrary conclusion.

The following report is concerned with the development of streptomycin resistance in patients treated at the Toronto Hospital for Tuberculosis, Weston, Ontario. The method

* From the Laboratories, Toronto Hospital for Tuberculosis, Weston, Ontario.

used, which is described below, employs a solid medium to which a representative cross section of the bacterial community is transferred following growth in diagnostic Lowenstein's medium. Good growth at a concentration of 50 mcgm. streptomycin per c.c., was taken to indicate resistance, bearing in mind the fact that at least 95% of the cases showed no growth in concentrations of more than 2 mcgm. streptomycin per c.c. prior to therapy.

METHODS

Diagnostic culture.—Sputa and fasting gastric were exposed to an equal volume of 23% tri-basic-phosphate for 24 hours at a temperature of 37° C. Following centrifuging and neutralizing with 0.1N hydrochloric acid, using bromothymol blue as an indicator, the sediment was planted in two diagnostic Lowenstein's slopes and incubated at 37° C., until positive, or for a maximum of eight weeks. Specimens from genito-urinary cases were, whenever possible, 24 hour urine specimens from which the tannic acid precipitated sediment was similarly treated.

RESISTANCE TESTS

A homogeneous suspension of a representative cross section of the growing bacterial community was made by transferring organisms from the Lowenstein's slopes to saline, making certain that samples from as many of the colonies as were apparent were included in the suspension. Equal volumes of the suspension were then spread on a series of Petri dishes containing Herrold's medium.* Each series included a control plate which contained no streptomycin and six others in which the concentrations of streptomycin were as follows: 0.5, 2, 5, 10, 25 and 50 mcgm. streptomycin per c.c. The plates were incubated at 37° C., for four weeks. At the conclusion of this period there was almost invariably confluent growth in the control plate. The growth in the remaining plates were read in degrees of positivity varying from ++++ to 0.

* HERROLD'S MEDIUM

Peptone	10 gm.
NaCl.	5 gm.
Beef extract (Difco)	3 gm.
Agar	10 gm.
Distilled water to a	1,000 c.c.
pH	7.2-7.3

Pour into flasks in 150 c.c. amounts. Autoclave at 15 lb. for 20 minutes. Cool to 56° C. Add streptomycin in the desired amounts. Also at 56° C., add aseptically, one egg yolk to each flask.

Ratio of resistance to sensitive strains.—While the method described above has the obvious disadvantage that it does not provide the intimacy with streptomycin such as would prevail in a fluid medium, it is however possible, by registering the discrepancy in the degrees of positivity between any given plate and the control, to arrive at a rough estimation of the ratio of sensitive to resistant variants at a given concentration of streptomycin. The arbitrary term "completely resistant" has been applied to those cases in which growth at a concentration of 50 mcgm. streptomycin per c.c., has approached, visually, the growth at four weeks in the control plate. Further elaboration of this investigation by whatever method, might divulge information which would eliminate those paradoxical problems in which clinical improvement continues despite laboratory assurances that a given case is now "resistant".

TABLE I.

		PRE-STREPTOMYCIN SENSITIVITY						
Specimen	C	0.5	2	5	10	25	50
Sputum	++	++	++	0	0	0	0

Pre-streptomycin sensitivity tests have been completed in some 225 cases. In 95% of cases results of the order of those shown in Table I have been obtained. In the remaining 5% growth has occurred in 5 mcgm. streptomycin per c.c., or, very occasionally in a concentration of 10 mcgm. streptomycin per c.c. It is recognized that the concentrations required completely to inhibit growth are of a higher order than obtains in a fluid media, but comparisons carried out in these laboratories with a modified Dubos medium,* show the discrepancy to be of a constant order of magnitude.

TABLE II.

INCIDENCE OF IN VIVO RESISTANCE		
Complete cases (pre- and post-streptomycin cultures)	88	55%
Negative on culture following therapy	72	45%
Total cases	160	100%

Table II indicates the position with regard to 160 cases in which investigations were undertaken before and following therapy. Cases

* Dubos Medium, D.V.A. modification. Personal communications from the Laboratories, Christie Street Hospital, Toronto, Canada.

were regarded as being negative when at least one specimen of sputum (three day pool) or one fasting gastric were negative at the conclusion of eight weeks' culture.

TABLE III.

Completely resistant (50 mcgm.)	37	41.6%
Marked increase in resistance (10 to 25 mcgm.)	18	20.5%
No significant increase	33	37.7%
Total cases	88	

Table III represents the incidence of streptomycin resistance developing in the 88 cases in which positive cultures were obtained before and after treatment.

Follow-up investigations.—In those cases from which positive cultures may be obtained regularly following therapy, it has been considered of interest to carry out investigations at monthly intervals. In no instance where this has been done in a "resistant" case has it been possible to demonstrate a return to a predominantly sensitive bacterial community, although it is of interest to note that at least on two occasions, resistant variants were not demonstrated until the elapse of some two months following the conclusion of therapy. Continued investigations of this nature are proceeding.

Time of development.—In the majority of cases in which resistance developed, the resistant variants were shown to dominate the cultures at the conclusion of seven to eight weeks of continuous therapy on 1 gm. streptomycin daily. In a relatively small percentage of cases in which resistance was eventually demonstrated, resistant variants did not become apparent for a much longer period and in some instances, already noted, not for several months after the conclusion of therapy.

Direct and indirect methods.—It has been noted, in cases in which tests have been performed by both a direct and indirect method, that in those instances in which the organisms are planted directly to the Herrold's medium without previous incubation and growth in Lowenstein's media, resistance as indicated by growth in serial dilutions seems to be less than if the bacilli were previously grown on artificial media. This may have an explanation in a possible streptomycin content of sputum or alternatively may be related to changes brought about by growth on artificial media.

SUMMARY

(1) The incidence of the *in vivo* development of streptomycin resistance is reported in 88 cases treated by 1 gm. of streptomycin daily in divided doses for periods of 60 to 90 days. (2) attention is drawn to the following points: (a) the possible advantage of a solid medium whereby some indication may be obtained of the relative number of resistant and sensitive variants. (b) The high incidence of streptomycin sensitive strains encountered prior to therapy. (c) The possible delay in the appearance of streptomycin resistant variants even after the conclusion of therapy. (d) The absence of a return, even after several months, to a sensitive state. (e) The relative early onset of resistance. (f) Possible discrepancies in reported results depending on the methods employed.

The authors wish to indicate their indebtedness to Professor P. Greey for his constant advice and guidance, and to Miss C. Daniels and Miss E. Whitcher for their meticulous attention to records. Permission to publish the note was obtained through the courtesy of Dr. C. A. Wicks, Superintendent, Toronto Hospital for Tuberculosis, Weston, Ontario. We also acknowledge the financial aid given in these projects by the Ontario Department of Health through the Federal Health grants.

EXTRA-PERITONEAL, END-TO-END SUTURE OF THE FEMORAL NERVE*

Campbell Gardner, F.R.C.S.[C.], and
Harold Elliott, M.D

Montreal, Que.

FEMORAL nerve lesions are rare and few have been recorded.

Pollock and Davis¹ in their excellent treatise noted that injuries to the femoral nerve in World War I occurred in less than 1 to 2% of the cases studied. In an analysis by Stookey² of the frequency of nerve injuries of the lower extremity the femoral (anterior crural) nerve was injured less commonly than sciatic, peroneal and tibial (in that order) but more commonly than anterior tibial, lumbar plexus, small sciatic and musculocutaneous. Benisty³ confined his discussion to the effect of a projectile traversing femoral branches below the inguinal ligament. Gurdjian⁴ reported in 1931 suture of an almost-completely-divided nerve, originally caused by incision and drainage of an extensive inguinal abscess. This patient's progress seven months after operation was suggestive of recovery. Haymaker and Woodhall⁵ dealing with World War II injuries note that femoral nerve trunk injuries were seldom "seen clinically since wounds in this region by lacerating blood vessels tend to be fatal". Sutures have been done on the femoral trunk in certain peripheral nerve centres in Great Britain but the results had not been published

when this study was first presented to the Montreal Neurological Society in January, 1947.

In our series of over 500 nerve injuries, we have had only three examples of femoral nerve injury. Two were incomplete and in this third example, end to end suture was obtained by the method described.

Since the mortality rate from missile wounds of the abdomen has been improved in World War II, complete femoral nerve lesions which usually have an associated abdominal wound, are likely to be more common than following World War I.

The same principles hold for suture of the femoral nerve, even though its course is mainly intra-pelvic, that apply to any peripheral nerve. There should be early recognition; there must be adequate exposure; mobilization will often overcome great gaps; flexion of joints should be utilized; proper nerve pattern must be obtained; and with care the vast majority of nerve lesions can be repaired by end-to-end suture.

Because of the short distance to the quadriceps (the down-growing neurofibrils of the femoral nerve have approximately 12 cm. to travel),* and since the long, flat, coarse muscles of the quadriceps group are to be innervated, fair prognosis can be given, even though sutured late. This communication has been withheld during the period of follow-up. The patient noted improvement in sensation at eight months, and returning power in the quadriceps at ten months after injury.

CASE REPORT

Pte. D.E., wounded on October 6, 1944. The missile entered the left hip, fractured the crest of the ilium, and emerged in the right lower abdomen (passing on-wards and fracturing the patient's right thumb). Three holes in the small bowel were closed in No. 8 Field Surgical Unit and a lacerated sigmoid colon was exteriorized as a double barrelled colostomy. On November 6, 1944, secondary suture of the multiple wounds of the right thigh was carried out. On December 27, 1944, the colostomy wound was clamped, and was closed three months after injury. Bowel movements were reported as normal on January 26, 1945.

His description of the moment of injury was as follows: "My left leg buckled up and I couldn't get it down and couldn't figure out why it wouldn't go down. I was standing with my Bren gun between a hedge and a field and we were being overtaken by the Germans. On being hit I felt a burning sensation in my hip and stomach. I twisted and fell and my whole body seemed to be paralyzed but this may have been because I was dead tired. I was unable to crawl to a slit trench where my officer was ordering us. Pretty soon I was able to move my wounded thumb and put it into my tunic. Be-

* From the Services of Surgery, and Neurosurgery, Queen Mary Veterans' Hospital and Montreal General Hospital, McGill University.

* H. Owen in the pathological laboratory of the Montreal General Hospital did several dissections to prove this point. It depends on the situation of the junction to form the femoral nerve trunk.

cause of my buckled knee I then had to lie on my right side."*

The wound in the left iliac region broke down several times, discharging purulent material in February, April and June, 1945. On June 9, a sinus in the left iliac region was explored and a search was made for the femoral nerve by an abdominal surgeon. Although the femoral vessels were demonstrated, no trace of the nerve was found and it was assumed that a portion was missing. The wound failed to heal completely and on October 11, three sinus tracks in it were excised along with fragments of bone curetted from the left ilium. The wound then healed, except for a small area which united by secondary intention.

History of peripheral nerve injury.—From the moment of wounding there was paralysis of the muscles on the anterior aspect of the left thigh, with inability to extend the leg or the thigh. On getting up from bed in England he used crutches. Then he discovered that he could not walk without falling because his knee buckled underneath him whenever he stood alone or took a step. He could walk, after a fashion, with the help of a cane. He manufactured a splint for himself which prevented his knee from bending. Walking without a brace, he swung his hip around in external rotation and forward flinging of his hip. When stabilized, he then transferred the body weight to the weak leg and moved the good (R) leg forward. He was unable to walk upstairs without the brace.

When seen in the Peripheral Nerve Clinic, there was a small penetrating wound scar in the iliac region behind the left anterior superior spine, approximately 10 mm. below the left iliac crest. There was fair power in the ilio-psoas and adductor muscles, but no power in the muscles supplied by femoral nerve. There was marked atrophy of the whole leg, especially the anterior part of the thigh. Measurements of the thigh were as follows:

	Right	Left
Thigh	42.0 cm.	32.0 cm.
Mid calf	28.5 cm.	25.0 cm.

There was a mild flexion deformity of the knee due to overaction of the posterior thigh group muscles. This deformity was correctable by a detachable brace with an adjustable knee splint, which he wore regularly. The knee jerk was absent. There was gross quadriceps wasting and the other muscles of the thigh and hip were wasted from disuse. In knee flexion, the patella tended to slip down, interfering with complete flexion of the joint.

* This might represent an example of complete transient paralysis of an extremity in a high lesion of a nerve trunk as described by Livingstone.⁷

The sweating pictures (Figs. 1a and 1b) were made after the chinizarin-disulphonic acid sweating test was done as outlined by the technique of Gutman (absence of sweating in the feet in this patient is felt to be an artefact). The sweating dermatome as shown corresponds to the sensory pattern, but it is within the outer limits of the abnormal-normal pin prick barrier. There appears to be a slight amount of sweating below the knee which may be due to sympathetic components from the sciatic nerve contributing to the infra-patellar plexus.

OPERATIVE FINDINGS

A curvilinear incision was made 1" above and parallel to Poupart's ligament; the lower end being sharply deflected in vertical direction downwards just external to the femoral artery and crossing Poupart's ligament at



Figs. 1a and 1b.—Medial and lateral pictures after sweating test showing abnormality before operation.

this point. Above Poupart's ligament the muscles were split in the line of their fibres except the transversus which was divided obliquely at its upper end. Poupart's ligament was left intact but the vertical arm of the incision was deepened to expose clearly the femoral artery for its full length in Scarpa's triangle. The whole lateral flap of skin was dissected back giving free access to both thigh and the extra peritoneal space.

There was a large amount of scar tissue which at first prevented the identification of structures around Poupart's ligament including the femoral artery which we wished to use as a landmark. However, eventually we were able to identify this and following it upwards, lifting the peritoneum as we went, it eventually led close to the upper end of the femoral nerve as it made its exit from behind the psoas muscle. Similarly following the femoral artery downwards it was possible to pick up branches of the femoral nerve which when traced upwards led to the divided nerve.

Mobilization.—By lifting the psoas from the iliacus it was possible to trace the femoral to its origin from the vertebra and, somewhat at variance from the usual description, it remained as a complete nerve almost to the emergence of its roots. This allowed a very large amount of free play. Similarly below, by dissecting out the various branches considerable relaxation was obtained.

Two large neuromata lying directly in the missile path were seen opposite the crest of the ilium. The measurements of the neuromata were as follows: Femoral nerve above the level of the lesion; width $\frac{1}{2}$ ", diameter $\frac{1}{2}$ ". Proximal neuroma; length 1", width $\frac{5}{8}$ ", depth

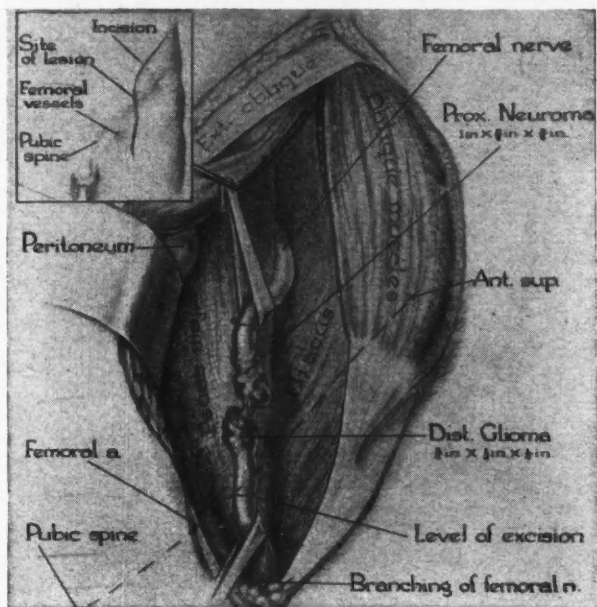


Fig. 2.—To show operative incision, muscle-splitting approach, extra peritoneal exposure of left femoral nerve from its emergence between psoas and iliacus to break up in the upper thigh.

$\frac{5}{8}$ ". Distal neuroma; length $\frac{3}{4}$ ", width $\frac{1}{2}$ ", depth $\frac{1}{4}$ ". Femoral nerve below the level of the lesion; width $\frac{1}{4}$ ", diameter $\frac{5}{8}$ ".

The lower neuroma had been driven inwards and there was a fibrous gap between the two ends as seen in the operative photographs and sketches.

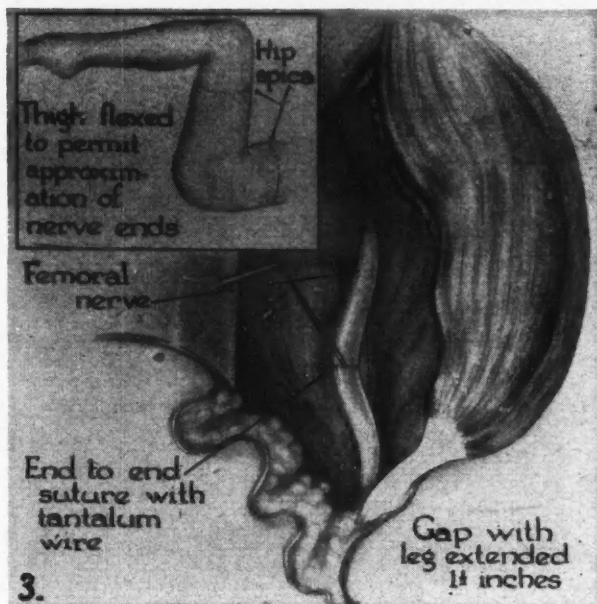


Fig. 3.—To show end to end suture and position of limb in order to obtain suture.

The proximal neuroma was excised and slices were cut back in the nerve until relatively normal pattern was obtained. The distal glioma was then excised, slicing was carried down the nerve until relatively normal nerve pattern was obtained. It was felt, how-

ever, that there was still some firmness in the distal end. After excision of the neuromata, a gap of $1\frac{1}{2}$ " remained. The proximal and distal ends of the nerve were then mobilized. The proximal end was visualized up to the transverse process of the lumbar vertebra and the low junction of the femoral nerve as described in text books was not seen in this instance. The distal nerve was then mobilized and the division in the femoral nerve in this case was seen to occur below Poupart's ligament rather than at the level of the ligament.

A sling suture was then put through both ends of the nerve and the leg was placed so that an end-to-end suture could be done. Eight small tantalum sutures were put through the perineurium with two guide silk sutures. Two identifying sutures were placed in the nerve at distances of 1" above and below the suture line. Tantalum foil was not put around the nerve suture because of the difficulty of removal. Satisfactory end-to-end suture was done and even with the leg flexed for about 60° there was still some slack in the nerve. However, the thigh was flexed at 90° on the body to make the suture safe.

The muscular closure was accomplished in layers using inverted silk sutures. The skin was closed with a continuous catgut shoemaker's stitch. The limb was flexed on the thigh continuously while this closure was carried out and then immobilized in a plaster hip spica. This overcame the unbalanced overaction and contracture of the posterior thigh muscles. The wound healed primarily. At three weeks the spica was divided and a turn-buckle was inserted, the thigh being extended 1 cm. daily thereafter.

FOLLOW UP

Motor studies.—January 29, 1947. Electromyogram showed definite reduction from continuous fibrillation to transient fibrillation in the rectus femoris.

February 5, 1947. Repeat electromyogram of rectus femoris before and after prostigmine revealed complete silence and was accepted as early evidence of partial neurotization.

August, 1947. Slight upward movement of the patella was visible although the patient had a "muscular feeling" that recovery was occurring before this.

November, 1947. Motor movements became increasingly stronger in quadriceps and electromyogram had gone on to definite polyphasic units.

Sensory studies.—First sensory recovery was noted in March, 1947, with the appearance of paræsthesia along the inner aspect of the upper thigh. In April, 1947, this paræsthesia had spread along the lateral and superior aspects of the anterior thigh. In June, 1947, the entire anterior aspect of the thigh had become paræsthetic. This abnormal feeling spread down the leg and in turn was replaced in the thigh by hypalgesia. In October, 1947, the entire thigh was hypalgesic except for a small area around the patella. In December, even the patellar area showed improvement to hypalgesia. The patient has since gone to work in a garage where he is actively employed.

Patient was last seen October, 1948, when sensation had returned over the whole of the femoral nerve distribution but pin prick still evoked a "tingling" response. There was active movement in the quadriceps. The knee jerk had not returned, although there was a "flicker" response obtained in upper part of thigh muscles on tapping the patellar tendon. The patient still wore his brace at work but discarded it each day after work. He had grown careless in his quadriceps exercises but the recovery present suggested that with rigorous retraining he could develop his thigh muscles and eventually do away with his brace.

DISCUSSION

We have felt obliged to record this femoral nerve case in detail since it has proved to be a remediable lesion. We did not at first think so. Based on our series, there must be one femoral nerve injury in each 500 war injuries of peripheral nerves where abdominal wounds are well-handled. This nerve, though sutured two years after injury, has obtained satisfactory recovery. (It is to be noted that the patient had a partial sciatic lesion after operation due to over rigorous stretching of a knee contracture in the hip spica.)

SUMMARY

1. Few detailed experiences of femoral nerve injuries are recorded.
2. Femoral nerve injuries are to be expected in lower abdominal missile wounds; and the experience in World War II has demonstrated that these wounds are not necessarily fatal.
3. Femoral nerve suture may not be possible as early as in other peripheral nerve injuries, but recovery can be expected, even though delay is as long as two years after operation.
4. Rehabilitation and tension (quadriceps) exercises are especially important during the recovery phase so that the patient may not become "wedged" to his brace and allow femoral muscles to develop disuse atrophy.

REFERENCES

1. POLLOCK, L. T. AND DAVIS, L.: *Peripheral Nerve Injuries*, H. B. Hoeber, New York, 1933.
2. STOOKEY, B. D.: *Surgical and Mechanical Treatment of Peripheral Nerve Injuries*, W. B. Saunders, Philadelphia, 1922.
3. BENISTY, A.: *The Clinical Forms of Nerve Lesions*, University London Press, 1918.
4. GURDJIAN, E. S.: *J. Michigan Med.*, 30: 508, 1931.
5. HAYMAKER, W. E. AND WOODHALL, B.: *Peripheral Nerve Injuries*, W. B. Saunders, Philadelphia, 1945.
6. TINEL, J.: *Nerve Wounds*, Wm. Wood, New York, 1917.
7. LIVINGSTON, W. K.: *Pain Mechanism*, Macmillan & Co., New York, 1942.

GLOMUS TUMOURS

Harold Gold, M.D.

*Departments of Pathology, University of
Toronto and Toronto General Hospital,
Toronto, Ont.*

THIS paper is based on a review of 24 cases of glomus tumours which are on file in the surgical pathological laboratory of the Toronto General Hospital.

These tumours were probably first recognized in 1812 when William Wood presented five cases of painful subcutaneous nodules.¹² Later authors recorded them as angiosarcoma, perithelioma, and fibromyomatous angioma.^{6, 23} Sucquet, in 1862, outlined the arterio-venous anastomosis, while Hoyer's¹³ description in 1877 was more detailed. In 1920 Barre recognized the clinical entity, and Masson, in 1924, published a report of Barre's cases and one of his own.^{20, 26} Masson called these entities "neuro-myo-arterial glomus tumours" (glomus—a conglomeration or plexus of minute arteries and veins).²⁰

Most authors find an equal sex incidence,^{4, 9, 13} but, in the present series, the male cases more than doubled the female ones. There is a wide range in the age group, while symptoms may range in duration from months up to years. Geographic and racial characteristics are not remarkable. The tumours are most frequently located on the ventral surfaces of the hands and feet, the tips of the digits, including the nail beds, the thenar and hypothenar eminences, and the palmar surfaces of the first three phalanges.^{11, 17, 22, 24} The present group exhibits a fairly wide distribution, being most often encountered in the upper extremities. Trauma has sometimes been incriminated as an antecedent factor in the production of these tumours, but a history of this was obtained in only two of the cases (Table I).

Sections of glomus bodies and tumours were studied under various staining procedures, including hæmatoxylin and eosin, phosphotungstic acid hæmatoxylin, Masson's connective tissue stain, Verhoeff's stain for elastic tissue, Laidlaw's silver stain for reticulum, and Bodian and Gross-Bielschowsky stains for nerve fibrils.

GLOMUS BODIES

To adequately understand the glomus tumours one should have a clear acquaintance

with glomus bodies. The latter are cutaneous arterio-venous anastomoses which are found in the deeper layers of the corium of the skin.

An afferent artery arises from branches which run in the subcutaneous tissue parallel to the surface of the skin. It goes upwards

TABLE I.

Sex:	
Male.....	17
Female.....	7
Age:	
10 to 19.....	3
20 to 29.....	4
30 to 39.....	2
40 to 49.....	6
50 to 59.....	1
60 to 69.....	4
70 to 79.....	4
Birthplace:	
Canada.....	10
Central Europe.....	3
British Isles.....	5
Unknown.....	6
Location:	
Upper Extremity.....	15
Nail.....	3
Finger.....	3
Hand.....	2*
Forearm.....	4
Arm.....	3
Lower extremity.....	6
Foot.....	2*
Leg.....	4
Body.....	1
Buttock.....	1
Face.....	2
Unknown.....	1
Symptoms:	
Pain.....	16
No definite pain.....	2
Sympathetic.....	(1)
Unknown.....	6
Duration of symptoms:	
Months.....	1
1 year.....	1
2 to 5 years.....	6
6 to 10 years.....	1
11 to 20 years.....	4
21 to 35 years.....	1
Unknown.....	10
Size:	
Less than 0.5 cm.....	2
0.5 to 0.9 cm.....	4
1.0 to 1.9 cm.....	8
2.0 to 3 cm.....	3
Unknown.....	7

*Multiple—1 case

and towards the surface and, after reaching the inner zone of the dermis, divides into two branches. The stronger branch bends at right angles and continues parallel to the surface; the weaker branch divides again, some of the branches going to the papillary bodies, and the others to the arterio-venous anastomoses. The

actual anastomosis is called a Sucquet-Hoyer canal.^{12, 24} The afferent artery gives rise to one to four Sucquet-Hoyer canals and also gives rise to branches to form the preglomeric arterioles. The latter nourish the constituents of the glomus but do not communicate with the Sucquet-Hoyer canals.^{3, 24} The primary collecting veins encircle the glomus and form a voluminous receptacle with a large surface. The blood then goes to the subpapillary veins and thence to the deeper venous channels.³

The glomus unit, therefore, may be looked upon as composed of the afferent artery, the Sucquet-Hoyer canal, and the primary collecting veins.

The actual anastomosis forms the most interesting histological picture of the glomus body and attention has long been focused on it. Most authors believe that it is an actively dilating and contracting sphincter. However, it seems more plausible to suppose that the afferent artery is the regulating mechanism and the Sucquet-Hoyer canal represents a passive tube.

In the study of a normal glomus histologically, one sees the afferent artery with its attendant Sucquet-Hoyer canals (Fig. I). The endothelium, glomus cells and surrounding stroma are readily recognized, and these elements will be discussed more fully when the tumours themselves are examined.

At this point the physiological characteristics of the glomus bodies may be discussed. They have been called thermostats regulating the peripheral and, hence, the body temperature. Some say that as the glomus opens it allows heat dispersal through a large surface of collecting veins,⁴ while others contradict this and state that, as the glomus dilates, it diverts blood from the skin capillaries and thus reduces heat loss. Moreover, another theory would have the glomus vessels contract and force blood in the capillaries to give heat to the skin.^{15, 24} In spite of the conflicting views, it is true that the glomus is a shunt and that its probable function in the body is to sacrifice the temperature of the skin in order to maintain the internal heat. In other words, warm blood is diverted into the main circulation without being cooled in surface capillaries. Conversely one would expect it to be closed during warm weather. Regulation of blood pressure, as well as tactile sensibility, has been attributed to these structures.^{2, 3, 4, 17}

GLOMUS TUMOURS

The glomus tumour is an autonomous new growth and is therefore neoplastic. It maintains, however, benign characteristics. Since the tumour originates in and, more or less, reproduces a normal structure of the body, it may also be called a hamartoma.²⁰ The gross appearance is characterized by red or purplish nodules which are usually soft in consistency and somewhat lobulated. They range from 0.5 cm. to 3 cm. in diameter.

The microscopic description of the glomus tumour is much the same as for the normal body, save for the number and arrangement of the constituents. There may be marked dilatation of the canals with small numbers of glomus cells (angiomatous), (Fig. 2) or there may be a proliferation by glomus cells with fewer vascular channels (paucivascular) (Fig. 3). The stromal increase, together with its hyalin and myxomatous degeneration, is characteristic of the tumours.

One may now study the components of the canal, proceeding from within outwards. The endothelial layer is usually comprised of a single row of sparse, flattened cells but, in some cases, they are more plump and form two to three rows of cells which merge in with the surrounding glomus elements.

The glomus cells directly border the endothelial layer and, in some cases, appear to form the internal lining. They are rounded, polygonal or spindle-shaped cells with large round to ovoid nuclei, possessing a light, almost clear chromatin network and occasional small nucleoli. The cytoplasm is faintly eosinophilic or pale. There is no fat, glycogen, or mucus demonstrable in the cells.²

Various theories are advanced as to the origin of these cells. They have been classed as specialized neuromuscular cells,^{3, 6, 20} while others ascribe an embryonic or modified muscle source.^{16, 19, 23} They have also been called angioblasts¹⁹ or modified vascular cells,^{10, 16, 19}

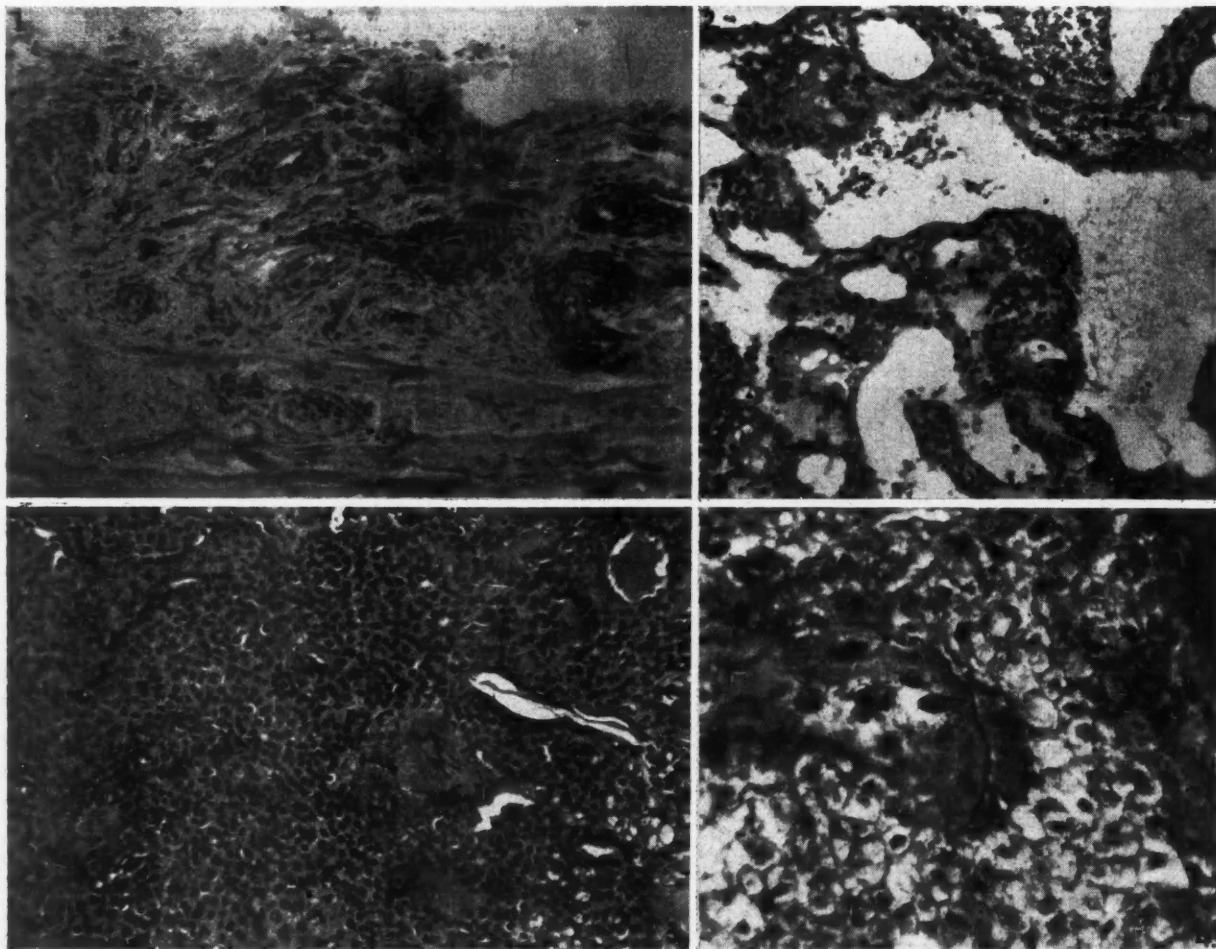


Fig. 1.—Normal glomus body—afferent artery to left, and numerous Sucquet-Hoyer canals (H. and E. x 80). Fig. 2.—Glomus tumour, angiomatous type (H. and E. x 80). Fig. 3.—Glomus tumour: paucivascular type (H. and E. x 80). Fig. 4.—Nerve fibre in stroma (Bodian x 360).

while still others identify them as pericytes or vascular satellites.²¹

The diversity of opinion confirms our state of ignorance of these interesting cells. Most authors, however, subscribe to the theory that they are modified smooth muscle elements and thereby exert an active force about the canal. Nevertheless, it is conceivable that the flow of blood is regulated by the afferent artery, and the Sucquet-Hoyer canal represents a passive expansile tube rather than an active sphincter. If this be so, the glomus cells are probably cushion-like buffers to a widely-dilating vascular channel, and may represent modified endothelial elements.

Although briefly mentioned by most, one is impressed by a most abundant reticular network which surrounds individual glomus cells and permeates everywhere. In other parts there is a loose and oedematous collagenous network which may show hyaline and myxomatous degeneration. Elastic tissue is found in the afferent artery but cannot be demonstrated in the glomus itself. Muscle fibres, *per se*, are not found in the tumours.

Most authorities fail to agree as to the amount of amyelinated fibres amongst the glomus cells. Many have described protoplasmic elongations of glomus cells which are connected with non-medullated nerves.^{9, 10, 14, 20} The recent study would suggest that most of the nerve fibres are running in a fibrous stroma, with a few amongst the glomus cells, and that the presence of these amyelinated nerves is probably fortuitous (Fig. 4).

CLINICAL SYNDROME

Clinically, the most important symptom is pain which has been described as stabbing, burning, and agonizing. It is brought on by pressure, posture or temperature changes, and paradoxically, may be relieved by pressure, heat, cold, but not by sympathetic or sensory nerve block.^{11, 22} It radiates for long distances but not in the distribution of skeletal nerves. The pain is paroxysmal but there may be an ache between attacks, becoming more severe with time.

The pain is not adequately explained, some authors believing that it is produced by pressure on neighbouring Pacinian corpuscles,^{3, 4, 12, 20} while others suggest that nerve fibres amongst the glomus cells are subjected to pressure by dilatation and contraction of the glomus elements.^{3, 4, 19} One would expect, therefore, to

find pain with the normal glomus body, which is not true. If one remembers that the tumours are autonomous new growths with tremendous numbers of Sucquet-Hoyer canals and afferent arteries, and that these structures are not under the graded control of dilatation that is found in the normal glomus, it is conceivable that enormous amounts of blood could be poured into the tumours, with tremendous expansion. A sudden increase of tension might explain the agonizing pain in the same way as peritoneal stretching causes pain.

Treatment.—The exquisitely tender nodules are best treated by simple excision and, if completely removed, they do not recur.

CONCLUSIONS

The glomus body is a cutaneous arterio-venous anastomosis, while the tumour is the benign neoplastic counterpart. The afferent artery is probably the regulating mechanism, while the Sucquet-Hoyer canal acts as a passive tube. It is suggested that the glomus cells act as a buffer or modified lining to a dilating vascular channel. The extreme pain of the tumours might be explained on the sudden increase in tension in an angiomatous structure which still connects with the general circulation.

I wish to thank Professor W. L. Robinson for his help and guidance in the preparation of this paper.

REFERENCES

1. ADAIR, F. E.: *Am. J. Surg.*, 25: 1, 1934.
2. ALLEN, E. V., BARKER, N. W. AND HINES, E. A.: *Peripheral Vascular Diseases*, Saunders, p. 562, 1946.
3. BAILEY, O. T.: *Am. J. Path.*, 11: 915, 1935.
4. BEATON, L. E. AND DAVIS, L.: *Quart. Bull. Northwestern Univ. M. School*, 15: 245, 1941.
5. BERGSTRAND, H.: *Am. J. Cancer*, 29: 470, 1937.
6. BLANCHARD, A. J.: *Canad. M. A. J.*, 44: 357, 1941.
7. COUCH, J. N.: *Canad. M. A. J.*, 44: 356, 1941.
8. DAVIES, H. T. *et al.*: *Brit. J. Dermat.*, 51: 312, 1939.
9. EWING, J.: *Neoplastic Diseases*, W. B. Saunders, 4th ed., p. 238, 1940.
10. GESCHICKTER, C. F. AND KEASBEY, L. E.: *Am. J. Cancer*, 23: 568, 1935.
11. GRAUER, R. C. AND BURT, J. C.: *J. A. M. A.*, 112: 1806, 1939.
12. GREIG, D. M.: *Edinburgh M. J.*, 35: 565, 1928.
13. JACKSON, H. AND BALKIN, R.: *Arch. Surg.*, 53: 100, 1946.
14. JAEGER, J. R. AND KINGREY, C. B.: *Rocky Mt. M. J.*, 38: 717, 1941.
15. KEASBEY, L. E.: *Int. J. Med. & Surg.*, 46: 431, 1933.
16. LENDRUM, A. C. AND MACKAY, W. A.: *Brit. M. J.*, 2: 676, 1939.
17. LEWIS, D. AND GESCHICKTER, C. F.: *J. A. M. A.*, 105: 775, 1935.
18. LOVE, J. C.: *Proc. Staff Meet., Mayo Clin.*, 19: 113, 1944.
19. MASON, M. L. AND WEIL, A.: *Surg., Gynec. & Obst.*, 58: 807, 1939.
20. MASSON, P.: *Lyon Chir.*, 21: 257, 1924.
21. MURRAY, M. R. AND STOUT, A. P.: *Am. J. Path.*, 18: 183, 1942.
22. OTTLEY, C. M.: *Brit. J. Surg.*, 29: 387, 1942.
23. OUGHTENSON, A. W. AND TENNANT, R.: *Surgery*, 5: 73, 1939.
24. POPOFF, N. W.: *Arch. Path.*, 18: 295, 1934.
25. STOUT, A. P.: *Human Cancer*, Lea and Febiger, Philadelphia, p. 698, 1932.
26. *Idem*: *Am. J. Cancer*, 24: 255, 1935.
27. SLEPYAN, A. H.: *Arch. Dermat. & Syph.*, 36: 77, 1937.
28. *Idem*: *Arch. Dermat. & Syph.*, 50: 179, 1944.
29. WEIDMAN, F. D. AND WISE, F.: *Arch. Dermat. & Syph.*, 35: 414, 1937.
30. WINSHIP, T. *et al.*: *Cancer*, 1: 441, 1948.
31. LEMMER, K. L.: *Arch. Surg.*, 57: 531, 1948.
32. LEHMAN, W. AND KRAISSL, C.: *Surgery*, 25: 118, 1949.

THE MALE FROG, RANA PIPIENS AS A BIOLOGICAL TEST ANIMAL FOR THE DIAGNOSIS OF PREGNANCY*

D. M. Bell, J. W. Macgregor, J. R. Vant

Edmonton, Alta.

FOR the past ten years at the Provincial Laboratory we have been using the adult female rabbit as a biological test for early pregnancy. The results of a large series of cases have averaged 97.5% accuracy. Our greatest difficulty has been to maintain an adequate supply of rabbits and we found that when the need was greatest the supply was poorest. Accordingly, we decided to investigate the possibility of the male frog as a biological vehicle. Before listing our experiences with the male frog as a test animal we shall briefly review the various biological tests of pregnancy.

The modern use of bio-assay as a test of pregnancy, dates back to 1928 when Aschheim and Zondek introduced a test utilizing immature female mice as a test animal. The mice are injected twice daily for a total of five doses of fresh morning urine and then ninety to one hundred hours after this first injection, they are killed and their ovaries examined for the presence of hemorrhagic follicles. The presence of these "Blut Punkte", indicate a positive sign for pregnancy, their absence indicates a negative test. The main modifications of this test have been the Friedman test, utilizing adult isolated female rabbits, developed in 1929, and the two hour rat test of Kupperman and Greenblatt, developed in 1943.

The chief disadvantage of the Aschheim-Zondek test and the Friedman modification have been the time interval, 96 and 48 hours respectively. The accuracy obtained is between 96 and 98%.

The two hour rat test developed in 1943 has eliminated the disadvantage of the time factor and, although the end points of ovarian hyperemia are not always clear cut, the original investigators report a 99.5% accuracy in their hands.

Using an entirely original animal, (the female South African clawed toad, *Xenopus laevis*) Hogben in the British Isles and Shapiro and Zwarenstein in South Africa, in 1922-34, developed another test of pregnancy. Briefly it consists of using adult female frogs and injecting aqueous extract of the urine to be tested into the dorsal lymph sac. With a positive test, the animals are observed to extrude numerous grossly visible eggs in 6 to 12 hours. The advantages of this test are its clear-cut end point, comparative rapidity, and an accuracy of 98 to 99% with no false positives. The chief disadvantages in the use of this animal are: the need to concentrate the urine before injection, and the technical difficulties experienced in obtaining and keeping these frogs.

In 1947 Galli Maini in South America described the use of the male toad (*Bufo Arenarum Hensel*) using 10 c.c. of untreated urine injected into the dorsal lymph sac. Cloacal urine collected in two to three hours and examined on a slide under the microscope, revealed the presence of numerous spermatozoa, if the urine used was from a pregnant woman. No sperms were visible if non-pregnant urine was used. He reported results of 98 to 100% accuracy. Mortality rate in the toad as a re-

sult of the test was 1.13%. He also stated that the toad can be used repeatedly after an interval of approximately one week between tests.

Using this information as a basis, Robbins and Parker of Boston, and Miller and Wiltberger of Columbus, Ohio, have found that the common American male frog, *Rana pipiens*, reacts in the same way as the male toad. They report using this as a test animal for a two to three hour test of pregnancy which is apparently quite accurate. In this series of 122 urines no false positive reactions were encountered and only one false negative reaction occurred on a urine early in pregnancy.

The basis for the reaction in the frog appears to be due to an anterior-pituitary-like substance, apparently derived from the placenta, the so-called chorionic hormone. The reaction produced seems to be due more specifically to the luteinizing principle of the chorionic hormone. Wiltberger and Miller report a 50% false negative reaction in the latter half of pregnancy. Our results correspond to their figures. The explanation of this fact lies in a knowledge of the normal titre of chorionic gonadotropin throughout pregnancy.

Evans, Kohls, *et al.* have shown that there is a rapid rise in titre levels of chorionic hormone from the onset of pregnancy to a peak about thirty days after the first missed menstrual period, and then a gradual decline to threshold levels about the sixty-fifth to ninetytieth day, continuing at this low level until the end of pregnancy. During the latter half of pregnancy there is also noted a slight variation in levels, being higher between expected menstrual periods than at the time of the expected menstrual flow. Also it has been noted that in the toxemias of late pregnancy there is very frequently a marked rise in chorionic hormone levels.

Care and handling of the frogs.—The American frog is widely distributed in this country and can be obtained easily from any frog farm or biological supply house, or could even be located locally. It seems best to keep the frogs in a cool, damp place preferably around the temperature of 34 to 40° F. In the Provincial Laboratory in Edmonton, we store the frogs in a concrete basin, which is kept moist with continually running cold water. They require no food under such conditions, but may be fed some earthworms, meal worms, flies, etc.

We have found it convenient to keep one to two dozen frogs in the room in which the tests are actually carried out. These are kept in ordinary sinks with running water and a small pan of water in the sink allows the frogs to jump in and out of the water at will. Some

* From the Departments of Pathology and Obstetrics, University of Alberta.

method for the segregation of the used frogs should be made. Frogs used in a negative test may be re-used at any time, but it seems preferable to not use them for four to seven days. Frogs that have been used and have given a positive result may not be used again for a period of at least four to seven days. Male frogs of this species can easily be distinguished from the female owing to a large thumb pad, usually pigmented.

Injection of the urine should be made subcutaneously under the skin of the back, using a small bore needle, 24 to 26 gauge. A large hole in the skin of the back may permit the urine injected to run out, thus nullifying the effects of the urine. During the mating season, especially, it would seem wise to test the urine of the frog prior to injection to make certain that it is negative.

Our technique and results in two simultaneous series are as follows:

Group R.—Consisted of running simultaneous consecutive frog and Friedman rabbit tests on the urine received at the Provincial Laboratory for Friedman tests. It may be noted at this time, that the urines for the routine Friedman tests are received from all parts of the province and therefore, are at times one to three days old prior to arrival and often are in a marked state of ammoniacal decomposition.

Group K.—Consisted of a group of fresh unknown urines received from the city, on which a careful clinical follow-up was available. This group consisted of urines from women in the various stages of pregnancy, mostly in the first trimester, and from women with various gynaecological complaints such as the menopause, pelvic abscess, fibroids, amenorrhoea of unknown etiology, corpus luteum cysts and ectopic pregnancies.

Technique.—Male frogs (*Rana Pipiens*), averaging 25 to 30 grams, were injected with 2 to 5 c.c. doses of filtered urine into dorsal lymph sacs using a small bore needle 24 to 26 gauge. The frogs were then placed in pint jars with a perforated lid, labelled and set aside at room temperature for two to three hours. Readings were made by grasping the frogs over the head and shoulders, thereby producing a reflex ejection of urine from the frog. A drop of this urine was placed on a slide and examined under the microscope, using a 4 to 16 mm. objective, for the presence of sperms. The presence

of any sperms, motile or not, indicates a positive result. No sperm indicates a negative result.

Throughout both series we were troubled greatly by the high frog mortality rate and in attempting to reduce this, we frequently resorted to half the 5 c.c. dosage and were impressed by the reduced mortality rate. This reduced dosage did not appreciably affect our final results. We also feel that in helping to reduce the mortality rate, it is important to keep the frogs at a low temperature, bringing them to room temperature only in carrying out the actual test.

Results in series R.—In Table I are the results of 107 consecutive cases in which both Friedman and frog tests were done.

TABLE I.

	Frogs	Rabbits
Positive	48	51
Negative	38	42
False positive	0	0
False negative	4	3
Unsatisfactory	18	10
* Accurate	95.4	96.9

* Percentage of accuracy exclusive of unsatisfactory tests.

The tests classified as unsatisfactory are those in which the frog or rabbit died. We feel that had two or more frogs been used in all tests, the percentage of unsatisfactory tests would have been much lower.

Thus it is seen that there was complete agreement between rabbit and frog tests in 77 instances: 42 positive and 35 negative cases. There were 13 cases where a result was obtained with the rabbit test and in which the frogs died. There were five cases where an apparently satisfactory result was obtained with the frog and in which the rabbits died. In five cases, both rabbits and frogs died.

EXPLANATION OF FALSE NEGATIVE REACTIONS

A. With the frog tests:

Case 13.—Frog negative, Friedman positive—obtained positive frog five days later. (Patient finally aborted one month later with a blighted ovum.)

Case 19.—Frog negative, Friedman positive—no follow-up obtained.

Case 47.—Frog negative, Friedman positive—in one and a half months both Friedman and frog test negative.

Case 104.—Spinal fluid on a case of proved hydatid mole—frog negative, Friedman positive.

B. With the Friedman test:

Case 33.—Friedman negative, frog positive—Friedman became positive in six days.

Case 46.—Friedman negative, frog positive—Friedman became positive in six days.

Case 94.—Friedman negative, frog positive—Friedman became positive in seventeen days.

In Table II is the actual number of frogs injected, including their dosage and results.

TABLE II.

	Dosage	
	5 c.c.	3 c.c.
Frogs	94	62
Positive	32	35
Negative	25	22
False positive	0	0
False negative	3	1
Percentage of unsatisfactory tests	36.1	6.9
Percentage of accuracy	95.0	98.3

Results of series K.—There are 152 cases which have been followed sufficiently clinically to either substantiate or refute our results. Table III shows the overall results obtained, using either 5 or 3 c.c. dosage or both, in which a definite result was given.

TABLE III.

Number of cases	152
Positive	78
Negative	65
False positive	0
False negative	9
Percentage of accuracy	94.1
* Corrected percentage of accuracy	97.9

* Exclusive of cases Nos. 20, 32, 43, 112, 125, 141, all of which are either in the last trimester or under fifteen days over the first missed period.

EXPLANATION OF FALSE NEGATIVES

Case 20.—Patient was eight and a half months pregnant.

Case 32.—Patient was five days over first missed period.

Case 43.—A repeat test of Case 32 when she was first fifteen days over first missed period. 5 c.c. dosage toxic to frogs and result only obtained with 2.5 c.c. dosage.

Case 112.—Patient was nine months pregnant.

Case 125.—Patient was fifteen days over first missed period. Friedman was positive five days later. Only 2.5 c.c. was used.

Case 129.—Case of ectopic pregnancy. Negative obtained with 3 c.c. dosage. Friedman positive five days later. A positive result with 5 c.c. dosage obtained ten days later and a positive result with 3 c.c. dosage obtained sixteen days later.

TABLE IV.

	Dosage	
	5 c.c.	3 c.c.
No. of tests	88	117
Positive	51	61
Negative	34	46
False positive	0	0
False negative	3	10
Percentage of accuracy	96.9	91.5
* Corrected percentage of accuracy	100	94.7

* Exclusive of cases No. 20, 112, 141 with 5 c.c. dosage and cases Nos. 32, 43, 125, 141 with 3 c.c. dosage.

Case 141.—Patient fifteen days over first missed period—proved tubal pregnancy. (Afternoon preoperative specimen of urine used.)

Case 174.—Case of proved ectopic pregnancy.

Case 176.—Negative result with frog. Obtained positive result seven days later. Patient three months pregnant. (Only one frog 3 c.c. dosage used.)

Table IV indicates the results obtained in the same series with a 5 and 3 c.c. dosage respectively.

EXPLANATION OF FALSE NEGATIVES

A. With 5 c.c. dosage:

Case 20.—Patient eight and one-half months pregnant.

Case 112.—Patient nine months pregnant.

Case 141.—Patient was fifteen days over first missed period. Proved case of tubal pregnancy (afternoon preoperative specimen of urine).

B. With 3 c.c. dosage:

Case 32.—Patient only five days after first missed period. (5 c.c. dosage was toxic.)

Case 43.—Repeat on Case 32—patient only fifteen days over first missed period (5 c.c. dosage still toxic).

Case 47.—Case of incomplete abortion, D. & C. done on day of test getting slight amount of placental tissue (5 c.c. dosage gave a weak positive result).

Case 67.—Threatened abortion at two months with eventual complete abortion. 5 c.c. dosage gave positive result.

Case 125.—Patient fifteen days over first missed period. Friedman positive five days later. 5 c.c. dosage toxic.

Case 129.—Case of suspected ectopic pregnancy. Friedman positive five days later. Eventually got a positive frog test using 5 c.c. dosage ten days later and then a positive with 3 c.c. dosage sixteen days later. Patient later proved to be ectopic pregnancy.

Case 141.—Ruptured tubal pregnancy. Afternoon preoperative specimen used.

Case 146.—Repeat test of Case 129, ten days later obtained positive with 5 c.c. dosage and negative with 3 c.c. dosage.

Case 174.—Proved tubal pregnancy.

Case 176.—Patient three months pregnant. Negative result obtained, positive result seven days later. (Only 3 c.c. used, 5 c.c. being toxic.)

Other interesting results are:

1. Two proved ectopic tubal pregnancies of six weeks' duration. Both strong positive results.

2. A true negative reaction on a case of missed abortion of four months' duration. D. & C. done, macerated fetus removed.

3. Strong positive on proved hydatid mole.

4. Two toxic patients, one at seven months and the other at term. Both gave strong positive results.

5. Negative reactions obtained on seven women between one and eight days post partum.

6. In a case of clinical diagnosis of pelvic abscess proved by posterior colpotomy, obtained a strong positive on fluid aspirated from a dead frog.

DISCUSSION

From the results given, it is seen that in a comparative series the frog and rabbit tests give approximately equal satisfactory results. That is, 95.4% accuracy with the frog and 96.9% accuracy with the rabbit.

There was one additional false negative result with the frog test. Only once in this series did a 5 c.c. dosage of urine give a positive result with the frog where a 3 c.c. dosage failed. The mortality rate of the frogs in this series is greatly reduced by reducing the dosage, and the accuracy was not impaired. That is, 95.0% accuracy with a 5 c.c. dosage and 98.3% accuracy with a 3 c.c. dosage.

In the series in which the only check was the clinical follow-up and in which there was a greater number of earlier and late cases, and also a more varied assortment of clinical conditions, the overall accuracy is considerably lower—91.4%. Careful examination of the false negatives obtained however, will show that four of the false negatives obtained were only fifteen days or less over their first missed periods, and two of the false negatives obtained were in last trimester, where clinically the test should not be required.

One of the main difficulties with the test was the relatively high percentage of unsatisfactory tests which can however, be greatly reduced by using lower dosage and using two or more frogs for each test. Adjustment of the pH of the urine might help lower this incidence of toxicity but was not attempted in this series.

One would expect that if one was able to get a positive result from a dead frog, that it should be quite accurate. This was found to be quite true except that in one case, we obtained a strong positive on patient (k-26) who had a pelvic abscess and ovarian cyst. All other positive reactions on dead frogs were apparently true positives. If a negative result is obtained however, from a frog that is obviously sick or dying at the end of two hours, the test should be repeated.

The possibility of obtaining this false positive reaction during the mating season, April to May, in this country has yet to be proved or disproved. However, it is stated that in the male toad, the stimulus responsible for the deposition of sperms on the extruded ova of the female, is a reflex nervous stimulation initiated by ambiplexus, and is not thought to occur in

the absence of ambiplexus. Hence, one might speculate that if the male frogs were segregated, they would be a satisfactory test animal even in the mating season.

CONCLUSIONS

The use of the male frog (*Rana pipiens*) in our hands, is a quick, cheap and satisfactory test for pregnancy. Two or more frogs should be used for each test for best results, reading should be done between two to two and one-half hours after injection.

Where the test urine is sent from a long distance or if it stands over for several days the frog mortality is sufficiently great to preclude the use of this test as a routine. We are endeavouring to find some method whereby this urine can be rendered less lethal. We do feel also, that this test should be used only to confirm clinical diagnosis.

REFERENCES

1. ROBBINS, S. L. AND PARKER, F. JR.: *Endocrinology*, 42: 237, 1948.
2. WILTBERGER, P. W. AND MILLER, D. F.: *Science*, 107: 198, 1948.
3. MAININI, C. G.: *J. Clin. Endocrin.*, 7: 653, 1947.
4. MILLER, D. F. AND WILTBERGER, P. W.: *Ohio J. Science*, 48: 89, 1948.
5. HAINES, M.: *Lancet*, 2: 923, 1948.

CASE REPORTS

B. PYOCYANEUS SEPTICÆMIA*

J. H. Fisher, C. C. Ross, J. A. Lewis,
J. H. Geddes, F. S. Brien, E. D. Busby,
F. S. Kennedy and J. L. Duffy

London, Ont.

Female, aged 44. Admitted November 3, 1948. This mother of two healthy children came in complaining of: pain in her joints; fatigue; sweating; cough; pain in the left chest; nausea and vomiting.

Over a period of about one year this patient had had recurring pains in her joints. Since August she had been troubled with pain and swelling of the hands, fingers, and wrists. The pain and associated stiffness were most marked in the morning—as the day wore on the hands became less troublesome. There was also pain in the shoulders, ankles, and knees. There was never any redness of any of the involved points. Fatigue was a feature of her condition and she had experienced much sweating, especially at night.

About six weeks prior to her admission she had consulted a doctor who told her that she was approaching the menopause and he gave her some hormonal preparation to take by mouth. Since that time she had recurrent nausea and vomiting and when she came to the hospital she was vomiting about a half of what she took. During the period preceding her entrance to hospital she had developed cough, shortness of breath, chilly sensations, pain in the left chest, and fever—following a cold.

* A case presented at Victoria Hospital Staff Meeting, December 2, 1948.

Her cough was dry and the pain in the left chest was made worse by deep breathing.

The past history, functional history, and family history were all negative.

Physical examination showed a well-nourished woman who looked slightly pale and obviously ill. There were no findings in the mouth, neck, or heart, and the blood pressure was 100/55. The chest examination revealed dullness at the left base with harsh breath sounds and râles. There was no enlargement of the liver or spleen and no abdominal mass could be made out. The pelvic and rectal examinations were negative. The hands showed the typical spindling of rheumatoid arthritis. The wrists and knees were not swollen. There were no subcutaneous nodules. The neurological examination was negative.

It was felt at this time that the patient had rheumatoid arthritis complicated by a left lower lobe pneumonia. The temperature was 102.3, the pulse 96, and the respirations 20. The blood count showed Hg. 76%, red blood cells 3,800,000, white blood cells 4,950 with 72% lymphocytes. The sedimentation rate four days after admission was 84 mm. in one hour. The x-ray of the chest showed the pneumonia that was found on clinical examination. The patient was placed on penicillin therapy and by November 6, the temperature was down to 99.4 and the signs of pneumonia had cleared.

Unfortunately, with the improvement in her chest condition she did not gain as was expected. She seemed depressed and uninterested and her temperature rose again to 102 and 103° where it remained during the rest of her hospital period. By November 12, nausea was a constant complaint, there was frequent vomiting of bile-stained material, weakness was pronounced, and she became delirious. Streptomycin was added to the penicillin but in spite of these medications her temperature continued.

On November 16, the patient appeared jaundiced. At that time the arthritis appeared much less marked. The psyche was clouded. Vomiting of coffee grounds material was a persistent feature. A puncture wound in the left ear for a blood examination led to a very profuse bleeding over a period of about six hours. The cause of this was not obvious. The prothrombin clotting time at this time was 32 sec. and the blood platelets numbered 176,000. This condition was treated by: (1) silver nitrate; (2) pressure bandage; (3) morphia; (4) thromboplastin, and (5) adrenalin packs. No further bleeding was encountered in this or in other areas. The tongue appeared dry. The heart findings were entirely normal. The abdomen was distended and coils of bowel could be discerned quite readily. No mass could be felt and the liver and spleen were not enlarged on clinical examination. With a negative blood culture, a low white blood count of 7,900 with 94% pmn., 19% of which were young forms, the jaundice with a prompt direct reaction showing 2.0 mgm. (ten times the normal) and a cephalin-cholesterol flocculation test which was 4 plus, it was felt that the patient had acute hepatitis. At this time the blood non-protein nitrogen increased to 90 mgm. and this, with urine which was essentially normal, was accounted for on a basis of vomiting (prerenal deviation of fluid). After intensive intravenous therapy this non-protein nitrogen value was reduced to 52 mgm. On November 17 there was bladder incontinence.

Because of continued vomiting it was decided to give the patient barium by mouth. This study revealed marked distension of the first and second parts of the duodenum (Fig. 1). This suggested obstruction in the third part of the duodenum but such a diagnosis was not supported by the fact that the barium passed through into the jejunum quite satisfactorily. The small bowel pattern suggested a form of ileus to the x-ray department. The barium was carried as far as the ascending colon but it did not pass beyond this point even after 48 hours. The stool examination was positive for occult blood. The abdomen became more distended and with the vomiting and jaundice a surgical opinion was sought. The surgeon was impressed by a deep tenderness in the right upper quadrant which was consistently

noted in a semi-comatose patient in the absence of a mass or of free fluid. After several examinations it was decided that it would be wiser not to operate. Instead a Wangenstein suction was started. This did not bring about any marked improvement in the patient's condition but everyone agreed that operation was not indicated.

An electrocardiogram was reported as normal in every respect. The urine showed a trace of albumen with occasional finely granular casts and as many as 10 red blood cells per field.

On November 19, one of the junior attending men noted bilateral Babinskis and the nurses on this date reported a stiff neck. In spite of continuous intravenous therapy and general supportive measures the patient's condition steadily became worse and she died on November 20.

Clinical diagnosis.—(1) Rheumatoid arthritis which had improved following the onset of jaundice. (2) Pneumonia left base which had cleared. (3) Acute infectious hepatitis.



Fig. 1.—The stomach is normal. There is a marked dilatation of the first and second parts of the duodenum. The nature of this is believed to be functional rather than mechanical.

CLINICAL DISCUSSION

Dr. C. C. Ross.—There are two possibilities—an inflammatory lesion or a malignancy. Fatigue and sweating might suggest either one. Was the pneumonia primary or secondary? The recovery from the pneumonia was rapid—was it unrelated to the general picture? The excessive vomiting suggests intestinal obstruction. Perhaps malignancy in the pancreas? The duodenal loop was very wide. In addition to stoppage of the barium at the hepatic flexure there was some suggestion of pressure on the outer side of the duodenum. This raises the possibility of a mass to the right of the duodenum which could perhaps account for the obstruction and vomiting. Cancer of the colon was not considered because there was no change in the bowel habits. An inflammatory mass in this area could produce fever and sweating. It might be a carcinoma

without symptoms which perforated. If it had been hepatitis the jaundice should have been present earlier. Some of the other signs and symptoms are not easily accounted for. There was some definite pathological change in the gastro-intestinal tract. The possibility of some intracranial condition that would account for the nausea and vomiting and Babinski signs at a later date has to be considered but the jaundice is not explained in this way.

My impression is an inflammatory lesion with a mass in the right upper quadrant producing some obstruction and giving the fever; or a malignancy in this area with added infection.

Dr. Lewis.—In a woman of 44 it is unlikely that multiple diagnoses should be necessary to account for such a picture. Therefore in order to make up a case with rheumatoid arthritis, regurgitant jaundice, with deep abdominal tenderness, distension and a clinical picture of bowel obstruction, with signs of a transient infiltration process in the left lung and terminal

signs of nervous system involvement with suppression of the bone marrow in the earlier phases, the most logical explanation to me would be visceral angiitis (disseminated lupus without skin manifestations).

Dr. Geddes.—The history of the jaundice was not long enough to be associated with infectious hepatitis or biliary cirrhosis. With fatigue, nausea, vomiting, dilated coils of intestine and no progress of the barium beyond the hepatic flexure it seemed reasonable to consider carcinoma in that area. There must have been ulceration, infection, and associated toxic hepatitis. The terminal neurological findings might have no anatomical explanation and they could be explained by terminal liver failure.

Dr. F. S. Brien asked if the patient was a Canadian and was told that she was. He felt with Dr. Lewis that the picture was one of acute or subacute disseminated lupus. He pointed out that some cases did not have skin manifestations. As an alternative he suggested

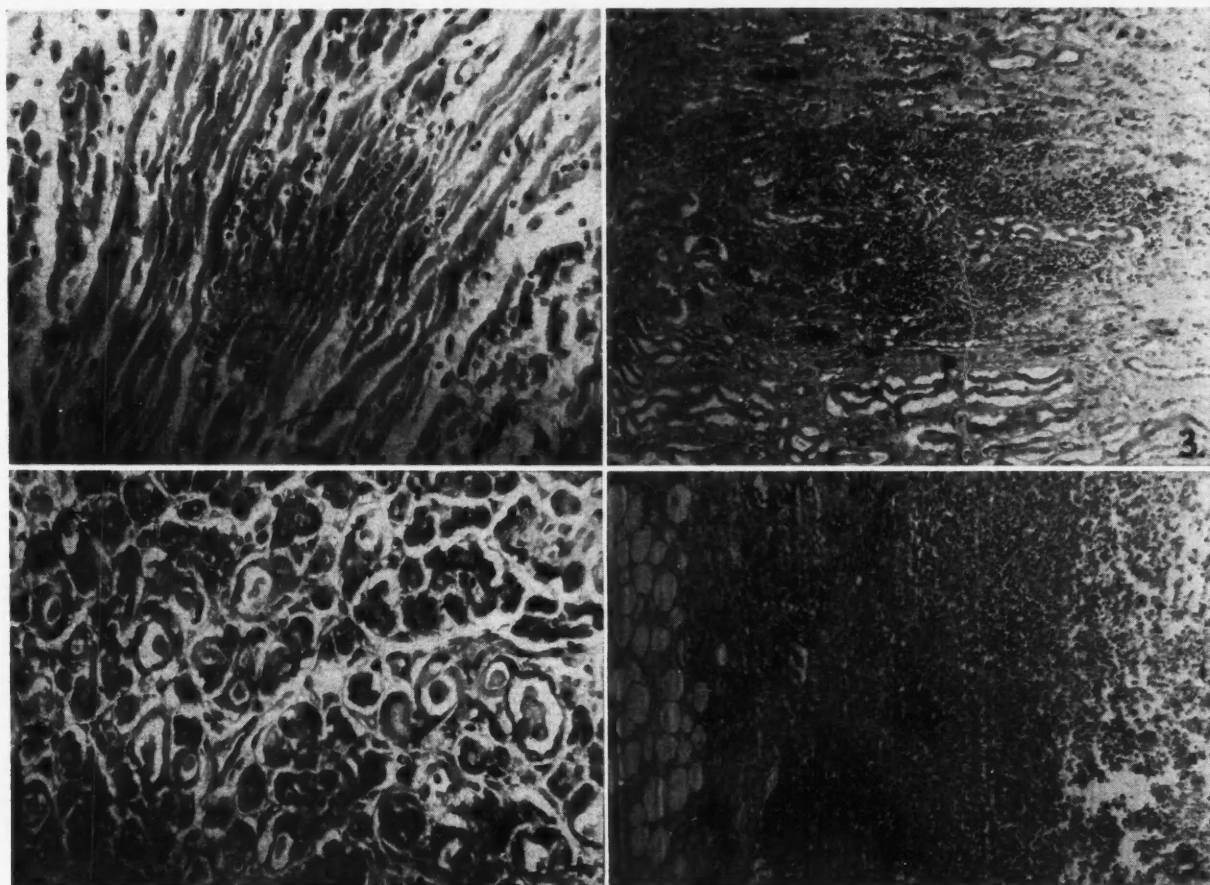


Fig. 2.—Infarct-like area of necrosis in myocardium infiltrated with polymorphonuclear leucocytes (x 230). **Fig. 3.**—Infarct-like area of necrosis in kidney. A heavy influx of polymorphonuclear leucocytes has occurred in the necrotic area (x 120). **Fig. 4.**—Pancreas showing uræmic changes. Note the dilatation of acini, the atrophy of acinar epithelium and the inspissated secretion in the lumina (x 230). **Fig. 5.**—Suppurative mesenteric lymphadenitis. At the right, necrosis and liquefaction have occurred and at the left inflammatory infiltration of perinodal fat is seen (x 120).

some sort of septic focus with death from extreme toxæmia. He suggested that it might be a toxic hepatitis related to septicæmia.

Dr. E. D. Busby felt that he could explain the entire picture on a basis of tuberculous chest disease, tuberculous peritonitis and terminal tuberculous meningitis.

Dr. Frank Kennedy favoured one of the collagen diseases with associated generalized arteritis. He felt that the possibility of generalized tuberculosis should be considered seriously.

Dr. Leonard Duffy did not feel that the question of malignancy had been excluded and he leaned to this explanation for the entire picture.

PATHOLOGICAL DISCUSSION

Dr. J. H. Fisher.—An autopsy was performed one hour and twenty minutes after death. External examination of the body revealed nothing of importance except well-marked jaundice. The serous cavities contained small effusions of clear, pale, bile-stained fluid as follows: pericardial cavity 100 c.c., right pleural cavity 300 c.c., left pleural cavity 150 c.c. and peritoneal cavity 400 c.c. For the sake of brevity positive and significant findings only will be given. Mild acute interstitial myocarditis and occasional tiny infarct-like areas of necrosis were found in the myocardium (Fig. 2). Areas of atelectasis were present in the lower lobes of both lungs but no gross pneumonia was found. A small abscess was present in the left lower lobe. It contained compact masses of fibrin condensed down almost like little concretions. The surrounding lung tissue showed very little inflammation or tissue reaction. The liver weighed 1,448 gm. It presented the picture of bile stasis and so-called toxic hepatitis. Mild fatty degeneration was present in the peripheral zone of the lobules. No abscesses, no evidence of infectious hepatitis and no inflammatory infiltration of the portal areas were seen. The gall bladder showed acute cholecystitis but contained no calculi. The spleen weighed 148 gm. It showed acute toxic splenitis and necrosis of many of the lymphoid follicles. Both kidneys showed cholemic nephrosis, a mild acute pyelonephritis and mild lower nephron nephrosis. Small infarct-like areas of necrosis were found in the medulla of the left kidney near the junction of cortex and medulla (Fig. 3). The pancreas showed acinar changes similar to those described by Bagenstoss¹ in uræmia (Fig. 4). The œsophagus showed acute œsophagitis and in its lower third small superficial acute ulcers. Many small acute ulcers were present in the stomach. The mesenteric lymph nodes, particularly those in the root of the mesentery of the small intestine and those about the head of the pancreas, were grossly enlarged, necrotic and suppurating (Fig. 5) measuring up to 4 cm. in diameter. A similar condition was found in the para-aortic lymph nodes. Upon sectioning the nodes a semi-fluid yellowish-green exudate and necrotic material poured out leaving a cystic-like structure with only a narrow rim of lymphoid tissue at the periphery. The mass of inflammatory lymph nodes near the head of the pancreas had involved the wall of the adjacent duodenum with inflammatory infiltration causing physiological rather than mechanical obstruction of duodenum. No lesions were found in the mucosa of the intestinal tract.

Permission for examination of the brain was not granted but a cisternal puncture yielded a yellowish cloudy cerebro-spinal fluid containing abundant polymorphonuclear leucocytes.

Cultures obtained at autopsy of blood, exudate from the suppurating lymph nodes and of the cerebro-spinal fluid, all yielded a heavy growth of *B. pyocyaneus*.

Anatomical diagnosis.—*B. pyocyaneus* septicæmia; suppurative mesenteric and para-aortic lymphadenitis; purulent leptomeningitis.

DISCUSSION

Dr. J. H. Fisher.—*B. pyocyaneus* possesses a number of peculiar and significant biological characteristics. It elaborates a potent proteolytic enzyme which is capable of digesting casein, fibrin, gelatin and albumen. It shows a tendency to localize in small blood vessels causing thrombosis and infarct-like areas of necrosis. Such lesions were seen in the myocardium and kidney in this case. In the human body *B. pyocyaneus* stimulates the formation of agglutinins which appear early, the presence of which may be of diagnostic importance. It develops resistance to streptomycin very readily. This organism is a common inhabitant of the skin, particularly moist skin surfaces such as the axillæ and anogenital region. It is found sometimes in fæces. Not uncommonly it is an air contaminant and has been found in samples of drinking water. It is a common contaminant of distilled water, solutions of penicillin, boric acid, saline and procain. The organism is Gram-negative and penicillin resistant. Evidence is accumulating which indicates that the incidence of *B. pyocyaneus* infections may actually be increasing due to the widespread and common use of penicillin both prophylactically and therapeutically. Penicillin controls many Gram-positive bacteria allowing the resistant Gram-negative organisms such as *B. pyocyaneus* to flourish uninhibited.

In the case here reported the fever, delirium, fatigue and sweating are related to the septicæmia. In *B. pyocyaneus* infections gastrointestinal symptoms may simulate typhoid fever. It is thought that the portal of entry in our case was through the gastro-intestinal tract and consequently a suppurative lymphadenitis resulted secondarily. A somewhat similar case was reported by Barker² in 1897. In *B. pyocyaneus* septicæmia the organisms are commonly found in the bile and in the gall bladder, somewhat akin to typhoid septicæmia. Thus acute cholecystitis was produced in this case. The tenderness in the right upper quadrant was due in part to the mass of inflammatory lymph nodes near the head of the pancreas and in part due to the acute cholecystitis. The jaundice was obstructive in type and caused by so-called toxic hepatitis.

Stanley³ has published an excellent review of *B. pyocyaneus* infections. Weinstein and Perrin⁴

have reported three cases of *B. pyocyaneus* meningitis, all of whom recovered following combined streptomycin and sulfadiazine therapy. Nearly 80% of the cases of *B. pyocyaneus* meningitis followed either diagnostic or therapeutic lumbar puncture including lumbar puncture for spinal anaesthesia.

REFERENCES

1. BAGENSTOSS, A. H.: *Am. J. Path.*, 24: 1003, 1948.
2. BARKER, L. F.: *J. A. M. A.*, 29: 213, 1897.
3. STANLEY, M. M.: *Am. J. Med.*, 2: 253, 347, 1947.
4. WEINSTEIN, L. AND PERRIN, T. S.: *Ann. Int. Med.*, 29: 103, 1948.

**HOMOLOGOUS SERUM JAUNDICE
TRANSMITTED BY A TATTOOING
NEEDLE**

**R. H. Roberts, M.B., Ch.B. (Liverpool),
M.R.C.S. (Eng.), L.R.C.P. (Lond.),
Surgeon Lieutenant Commander R.C.N.**

and

**Hereford Still, M.A., M.B., B.Chir. (Camb.),
Surgeon Lieutenant R.C.N. (R)**

Halifax, N.S.

It is now well established that homologous serum jaundice is transmitted either by the administration of whole blood or blood products containing the virus or by direct inoculation from person to person through the agency of a hypodermic syringe or other instrument, the sterilization of which has been inadequate.

Numerous instances have been recorded of homologous serum jaundice following plasma transfusions and among the other therapeutic substances incriminated are measles convalescent serum,¹⁰ mumps convalescent serum and yellow fever vaccine containing human serum.^{1, 5, 6}

The evidence that inadequately sterilized or unsterilized hypodermic syringes play a part in the transmission of homologous serum jaundice has been summarized in a Memorandum by the Medical Officers of the Ministry of Health.⁹ Bigger² has shown that pathogenic organisms may lurk in the barrels and nozzles of supposedly sterilized hypodermic apparatus and Hughes⁷ demonstrated that syringes used for intramuscular injections frequently become contaminated with blood even if no attempt is made to draw back the plunger.

The narrow and inaccessible parts of a syringe may thus defy a perfunctory sterilization but it would appear much less likely that a sufficiently large quantity of an infective agent could remain on a smooth solid instrument and be transmitted in turn to a number of persons. In

fact the recorded cases of homologous serum jaundice transmitted in this way are very few.

We feel it would therefore be of interest to place on record the following cases of homologous serum jaundice which we believe to have been transmitted by a tattooing needle. Quite apart from the unusual mode of transmission they indicate the minute amount of infective material that is sufficient to transmit the disease.

CASE 1

On June 11, 1949, the first patient A.L., an air-mechanic aged 21, reported sick. For three or four days he had noticed vague dull pains in his upper abdomen and during that period had been nauseated and anorexic. For four days his urine had been dark in colour and one day before admission he had noticed his eyes to be yellow. He had not been constipated but described his stools as "whitish".

On admission he was seen to be moderately jaundiced, the skin, mucous membranes and sclera being a lemon-yellow colour. Temperature 98.0°, pulse 66, blood pressure 115/68. The liver was palpable one finger breadth below the costal margin and was tender. Spleen not palpable. Physical examination otherwise negative. Hb. 94% (Sahli), sedimentation rate 2 mm./hr., white blood count 7,600, Kahn negative. Serum bilirubin—direct 7.9 mgm. %; indirect 11.0 mgm. %. Cephalin cholesterol 4 plus. Thymol turbidity 7 units. Urine, dark red colour, urobilinogen positive 1/20 dilution, bilirubin 2 plus. Stool, formed, grey in colour.

By June 17 the serum bilirubin had risen to 8.8 mgm. % direct, indirect 10.6 mgm. %, cephalin cholesterol 4 plus. The urine showed urobilinogen in a 1/80 dilution, bilirubin 1 plus. The patient was feeling much better, however, and made steady progress from then on. He was treated with bed rest and a high protein, high-carbohydrate, low fat diet with amino acid supplements. By July 17, he had no complaints and his normally robust appetite had returned. The icterus had completely faded. The liver edge was still palpable just below the right costal margin but non-tender. Serum bilirubin—direct 1.0 mgm. %, indirect 1.5 mgm. %, cephalin cholesterol 2 plus, thymol turbidity 5.2 units, bromsulphalein clearance—3% retention at 45 minutes. Urine—urobilinogen positive 1/20 dilution, bilirubin negative.

He gave no history of contact with jaundice cases in the service or among civilians and had not been on leave outside the area since October, 1948. His last inoculation (T.A.B.T.) was received in August, 1948 and since that time he had no injections of any sort nor had blood been taken from him for any purpose. He had received no hepatotoxic drugs. The significance of his tattoo marks was not then evident and he was diagnosed as a case of infective hepatitis.

CASE 2

On June 17, 1949, the second patient W.A., an air-mechanic aged 23, reported sick. For about seven days he had complained of a vague malaise and anorexia and his wife had noticed the yellowness of his eyes. His urine was seen to be dark in colour. He was constipated with stools of a normal colour. One day before admission he became more nauseated and vomited several times.

On admission he was seen to be grossly icteric, with marked staining of the sclera. Temperature 98.6°, pulse 68, blood pressure 120/70. His liver was enlarged to three fingerbreadths below the right costal margin. Spleen not palpable. Physical examination otherwise negative. Hb. 83% (Sahli), sedimentation rate 4

mm./hr., white blood count 4,500, Kahn negative. Serum bilirubin direct 5.0 mgm. %, indirect 8.0 mgm. %. Cephalin cholesterol 4 plus, thymol turbidity (20-6-49) 15 units. Urine, very dark in colour, urobilinogen positive 1/80 dilution, bilirubin 1 plus. Stool, constipated, normal colour.

The icterus deepened and he became much more nauseated. On June 22, his serum bilirubin levels were—direct 13.7 mgm. %, indirect 20.8 mgm. %, cephalin cholesterol 4 plus, thymol turbidity 15.5 units. Urine, urobilinogen positive 1/80 dilution, bilirubin 3 plus. These findings coincided with the maximum severity of his symptoms.

He was treated with bed rest and a high protein, high carbohydrate, and restricted fat diet. After June 23, his condition rapidly improved. On July 25, his liver was just palpable but not tender. His serum bilirubin levels were—direct 1.4 mgm. %, indirect 2.1 mgm. %, cephalin cholesterol 2 plus, thymol turbidity 5.2 units. Urine, urobilinogen positive 1/20 dilution, bilirubin negative.

W.A. also had no contact with jaundice cases and again the history appeared to be negative for any therapeutic or diagnostic procedure which might have led to homologous serum jaundice. He had received no hepatotoxic drugs during the previous year. He was, however, seen to be adorned with several obviously recent tattoos and he was asked when these had been done. It then transpired that both A.L. and W.A. were tattooed on February 5, 1949, by the same "artist". The men were asked whether others were present at the tattooing shop on that occasion and they recalled that a friend of theirs, K.M., was there and had been tattooed. Two other naval ratings unknown to them were also present as were two civilians.

CASE 3

K.M., an air-mechanic aged 21, was sent for and examined on June 24. He gave a history of a mild frontal headache, malaise and anorexia during the previous few days and had noticed his urine to be intermittently dark in colour. He was not constipated and had noticed no change in the colour of his stools. No yellowness of skin or eyes had been observed. He was admitted for observation and further investigation.

On admission he appeared quite well and no clinical icterus was apparent except for a faint yellowish tinge of the sclera which may have been normal for him. He was deeply tanned and a mild degree of skin staining may have been obscured. Temperature 98.0°, pulse 65, blood pressure 130/50. No enlargement of the liver was detected at that time. The spleen was not palpable. No other abnormal physical signs were elicited. Hb. 101% (Sahli), sedimentation rate 2 mm./hr., white blood count 6,700, Kahn negative, serum bilirubin—direct 0.7 mgm. %, indirect 2.3 mgm. %, thymol turbidity 2.8 units, bromsulphalein retention test, 15.5% retention at 45 minutes. Cephalin cholesterol 1 plus. Urine normal in colour, urobilinogen positive 1/20 dilution, bilirubin negative. Stools formed, normal colour.

His appetite rapidly returned and his few symptoms lasted only a few days. On July 7 his liver was just palpable but non-tender. The serum bilirubin levels then were, direct 0.2 mgm. %, indirect 0.4 mgm. %. The bromsulphalein test showed only a 6% retention at 45 minutes. Urine, urobilinogen positive 1/20 dilution, bilirubin negative.

There seems little doubt that K.M. was suffering from a mild, subicteric jaundice due to

parenchymal liver damage. He confirmed the story of the other ratings and admitted to being tattooed on February 5. He had no history of inoculations or venipuncture since October, 1948 and no contact with jaundice cases. He had received no hepatotoxic drugs. He could not help us identify the other two naval ratings present on February 5 but one of these reported sick shortly afterwards.

CASE 4

On June 29, 1949, J.A., a seaman aged 19, reported complaining of nausea. He had been feeling nauseated for three days and had complained of malaise, anorexia and vague upper abdominal pains. He was not constipated and had noticed no change in the colour of his stools. On June 28, his eyes were seen to be yellow.

On admission he showed a marked lemon-yellow icterus of skin and mucous membranes. The sclera were deeply stained. Temperature 98.4°, pulse 52, blood pressure 125/85. His liver was palpable about two fingerbreadths below the right costal margin and tender on pressure. The spleen was not palpable. Physical examination otherwise negative. Hb. 95% (Sahli), sedimentation rate 1 mm./hr., white blood count 7,300, Kahn negative. Serum bilirubin—direct 2.8 mgm. %, indirect 12.8 mgm. %, cephalin cholesterol 2 plus, thymol turbidity 11.2 units. Urine, dark red in colour, urobilinogen positive 1/10 dilution, bilirubin 2 plus. Stool, semi-formed, normal colour.

He was treated with bed rest and a high protein, high carbohydrate, restricted fat diet with amino acid and glucose supplements. The icterus deepened and he became very nauseated and completely anorexic. On July 7, he was intensely jaundiced and complained of pruritus. By July 13, he felt better but his serum bilirubin levels were, direct 18.8 mgm. %, indirect 22.8 mgm. %. Cephalin cholesterol 3 plus, thymol turbidity 4.8 units. Urine, urobilinogen positive 1/80 dilution, bilirubin 4 plus.

His condition slowly improved and by July 21, he had no symptoms. A faint icteric tinge remained in the skin and the sclera were still definitely stained. The liver was palpable about one fingerbreadth below the costal margin but was not tender. There were still marked changes in the blood chemistry. The serum bilirubin levels were, direct 8.0 mgm. %, indirect 12.2 mgm. %, thymol turbidity 5.2 units, cephalin cholesterol 3 plus. Urine, urobilinogen positive 1/10 dilution, bilirubin negative.

J.A. had also attended the tattooing shop on February 5, 1949. He was at first not sure of the date but clearly remembered that he had been there on the same occasion as A.L., W.A. and K.M. who, though unknown to him, impressed him by the exotic nature of the designs they were having executed. He recognized the other three ratings when admitted to the ward and accurately described their tattoos. Since February 5 he had no known contact with the other three ratings as he worked and lived in an entirely separate establishment some miles away. He had received no inoculation or therapeutic injection since February, 1948 and venipuncture had not been performed since November, 1948. He had received no hepatotoxic drugs.

From J.A. we learnt the name of the fifth naval rating but it turned out that he had de-

cided not to be tattooed on the occasion in question—fortunately as it happened. The two civilians we have not traced. One was described to us as being elaborately tattooed and it seems likely that they were merchant seamen. If this were so they may have developed homologous serum jaundice on the high seas or in some overseas port. Alternatively one of them may have been the source of the infection and perhaps developed overt jaundice later. We have made enquiries about hospital admissions for jaundice both among merchant seamen and the general population. These enquiries covered both the period around February 5, 1949 and the six weeks before our first case reported. They were completely negative.

TECHNIQUE OF TATTOOING

We have attempted to investigate the tattooing shop patronized by our patients but have been unable to do so because it is temporarily closed. The outside of the shop is dirty and unprepossessing and fits in with the descriptions we have of the interior.

The ratings all admit to having had a fair amount of alcohol before being tattooed. Their stories are consistent, however, and a summary is given for what it is worth.

The part of the body to be tattooed was shaved if necessary and cleaned with soap and water. A template bearing the design was then applied to the skin and left a faint dyed outline when removed. A separate "vibrator" handle complete with needle was used for each colour and when not in use the needles were thrust into holes in the bench. No accurate description of the needles could be obtained. The handle with needle attached was picked up, dipped into the appropriate dye pot and the tattooing carried out. No attempt was made to sterilize the needles between applications or between customers, the only concession to cleanliness being when the operator wiped the point of the needle with a rag—a procedure which was probably designed to clear the point of blood. When the design was complete the excess dye was wiped off and a "salve" applied on a clean dressing secured by strapping. This completed the operation. A small design of moderate complexity would take perhaps ten or fifteen minutes to complete and no time was lost between customers.

On the date in question the two civilians previously referred to were tattooed first and then A.L., K.M., W.A. and J.A. in that order and

in quick succession. Probably all four were tattooed in a period of less than an hour.

DISCUSSION

It seems to us reasonable to conclude that these four ratings were inoculated with the virus of homologous serum jaundice at the time of being tattooed. None of them had contact with clinical jaundice so far as can be determined and none had an inoculation or venipuncture more recently than eight months before the onset of symptoms.

A.L., W.A. and K.M. work in the same establishment but rarely eat together as W.A. and K.M. live separately in lodgings outside the station. It is possible, however, that these three men could have caught infective hepatitis from a common source unknown to us. Their cases coincided too closely for them to have infected each other. It must be emphasized that J.A. had no contact at all with the other ratings since the day of tattooing and for him to develop a sporadic case of infective hepatitis at the same time as the other patients seems to us too great a coincidence to be accepted. It is wildly improbable that a small outbreak of infective hepatitis would be limited to a group of people all of whom were tattooed on the same day several months previously. The incubation periods of 126, 132, 139, and 144 days (counting to the day of admission and assuming that infection was acquired on February 5) are consistent with a diagnosis of homologous serum jaundice.

If our theory is correct we must assume that the tattooing needle was contaminated with the blood or serum of a "customer" who was either incubating serum hepatitis or suffering from a mild attack of that disease. The identity of infective hepatitis and serum hepatitis as separate diseases is by no means certain and the source of infection in our cases may have been a person suffering from infective hepatitis. There is evidence, however (Havens, 1946) that when infective hepatitis is experimentally transmitted by parenteral inoculation the incubation period is much shorter than in the cases here reported. We cannot completely eliminate the possibility that the tattoo artist himself may have been infected but in that case the mode of transmission is not clear unless his blood, saliva or faeces contaminated the needle or wound, and there is no evidence that this took place. Assuming that the needle was involved we must infer

that the same needle was used on the infected customer and then on all our patients in turn, a small amount of the infective material being inoculated into each. It may be objected that very little of the infective material could be carried over in this way. This is true, but the available evidence shows that only a minute quantity of serum is necessary to transmit the disease. Thus Bradley³ observed homologous serum jaundice in cases inoculated intracutaneously with 0.1 c.c. of normal strength reconstituted human serum (for serum allergy tests) and Oliphant *et al.*¹¹ had similar findings. Havens (1946), transmitted infective hepatitis to volunteers by the parenteral inoculation of only 0.01 c.c. of infective serum. The earliest recorded cases of what was probably homologous serum jaundice, those described by Lurman,⁸ were produced through the agency of glycerinated "humanized" vaccine lymph presumably inserted in minute quantities by scarification. Sawyer *et al.*¹² mention the case of a doctor who contracted homologous serum jaundice through pricking his finger with a needle used to draw blood from a patient suffering from the disease.

If we can accept the fact that only a minute inoculum is necessary there is nothing inherently improbable in the mode of transmission we have suggested.

For some reason tattooing has a fascination for the sailor and though we now rarely see the elaborate tattoos of former years the trade is still reasonably brisk. Every seaport has its share of tattooing shops, which vary considerably in their standards of cleanliness, the dirty insanitary den being all too common. In our experience most people in later years bitterly regret having been tattooed. Quite apart from this there is a real danger if dirty needles are used and most service medical officers have seen examples of recent tattoos showing signs of infection. Probably many mild infections are never reported because the tattooed man is already heartily ashamed of his new decoration. The cases we report suggest very strongly that something more serious than local infection may result from a faulty tattooing technique. Two of our patients had severe degrees of jaundice and could yet show signs of permanent liver damage.

The reputable tattooing shop in which a sterile technique is used is no doubt beyond reproach but such places are not often found. We feel that city and port health authorities should

closely supervise all tattooing shops and should use their powers to close the dirty little dens where most of the tattooing "artists" seem to work. We have reported our cases to the appropriate medical health officer and we hope that the publication of this brief paper will strengthen the hands of all who are attempting to deal with the problem.

SUMMARY

Four cases of jaundice are described.

The four patients were all tattooed on the same day and in the same establishment several months previously.

A diagnosis of homologous serum jaundice was made and reasons are given for holding the tattooing needle responsible for transmitting the disease.

A plea is made for closer supervision of tattooing shops.

We wish to thank Surgeon Captain A. McCallum, O.B.E., Medical Director General, Royal Canadian Navy, for permission to publish this paper.

REFERENCES

1. BEESON, P. B., MCFARLAN, A. M. AND CHESNEY, G.: *Lancet*, 1: 814, 1944.
2. BIGGER, J. W.: *Lancet*, 1: 457, 1943.
3. BRADLEY, W. H.: *Brit. M. J.*, 2: 268, 1944.
4. FINDLAY, G. M. AND MCCALLUM, F. O.: *Trans. Roy. Soc. Trop. Med. & Hyg.*, 31: 297, 1937.
5. FINDLAY, G. M., MCCALLUM, F. O. AND MURGATROYD, F.: *Ibid.*, 32: 575, 1949.
6. FOX, J. P., MANSO, C., PENNA, H. A. AND PARA, M.: *Am. J. Hyg.*, 36: 68, 1942.
7. HUGHES, R. R.: *Brit. M. J.*, 2: 685, 1946.
8. LURMAN: *Berl. klin. Wschr.*, 22: 20, 1885.
9. Memorandum by Medical Officers of Ministry of Health: *Lancet*, 2: 116, 1945.
10. MCNULTY, A. S.: Report of Medical Officers of Ministry of Health, London, 1937.
11. OLIPHANT, J. W., GILLIAM, A. G. AND LARSON, C. L.: *Pub. Health Rep.*, 58: 1233, 1943.
12. SAWYER, W. A., MEYER, K. F., EATON, M. D., BAUER, J. H., PUTNAM, P. AND SCHWENTKER, F. F.: *Am. J. Hyg.*, 40: 72, 1944.

FATAL SMALL BOWEL OBSTRUCTION DUE TO SWALLOWED PINS

J. A. Weddell, M.D.

Parsons' Clinic, Red Deer, Alta.

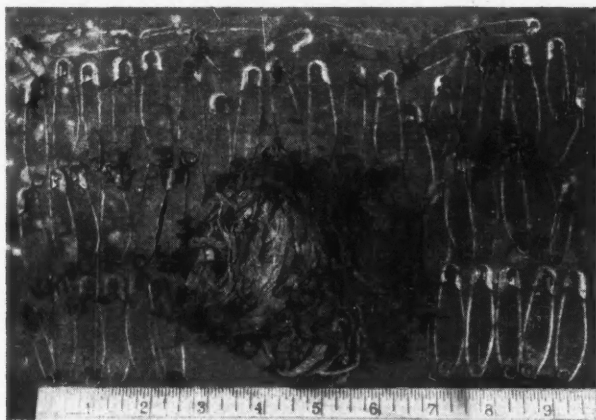
The patient was a white female, aged 20, an inmate of the Provincial School for the Mentally Retarded. As she was in the low imbecile group, it will be understood that a detailed history and functional inquiry were necessarily limited. However, the history obtained showed that she had complained of severe intermittent upper abdominal pain for seven days before being seen, as well as constipation and recurrent vomiting. Apparently she had had occasional bouts of similar pain in previous years which had always been relieved by an enema. Bowel function would be normal for long periods of time between these attacks.

At the time of examination, functional inquiry only revealed that the patient had been taking fluids and soft foods until the past twelve hours. She was in a very severe state of dehydration and toxicity and was beyond the point where operation might help. The abdomen was markedly distended and rigid; there was tenderness which was localized largely to a firm mass, which moved from the left to the right lower quadrants on movement of the patient. Rectal examination caused much discomfort and no mass was felt. Repeated enemata were ineffectual.

In spite of intravenous fluids, penicillin and the usual therapeutic measures, the patient died within 24 hours.

POST-MORTEM FINDINGS

Loops of bowel, grossly distended were adherent with a heavy greenish yellow exudate of foul odour. There was some free fluid, greenish yellow in colour. A twisted gangrenous loop of small bowel, weighted by a firm mass, was found at distance 44" from pylorus. There was one small perforation in a proximal loop of bowel adherent to this mass.



The mass proved to be intraluminal and consisted of more than 50 safety pins (2" length) all closed, matted together with pieces of 1' bandage, strips of cellophane from cigarette boxes, ordinary string and cord as well as tapes from clothing or curtains.

The main body of the mass was egg-shaped, and measured 3" in length by 1½" in width, with an overall outside measurement of 10" in its longer axis and 6" in its transverse axis.

Attached to the mass at either end were trailing, tapering lengths of matted string, tape, cellophane and bandage measuring 14" distally and 13" proximally.

From the history and from the gross matting of the component parts it seems reasonable to assume this accumulation of foreign material took place over a period of time.

It is interesting to consider this series of events taking place in small bowel without earlier development of the serious complications, although we feel that in a person with a normal pain threshold the situation would have come to light much earlier.

SPECIAL ARTICLE

THE NATIONAL HEALTH SERVICE, FROM THE VIEWPOINT OF A GENERAL PRACTITIONER

J. A. L. Magee, M.D.

Beaconsfield, Eng.

As a general practitioner of over 25 years' experience, I shall attempt to give my personal views of the British Health Service. Let me say at once that the scheme is a revolutionary one, and like all revolutions, its possible benefits will not be apparent at first.

The idea of a National Health Service is not new. It has exercised the minds of medical authorities for many years. However, in 1944, the Government, guided largely by a very able report presented to them in 1942 at their request by Sir William Beveridge, formulated a scheme for National Insurance included in which was a plan for a National Health Service.

When the Socialist party was returned to power in 1945, they found that the ground for the scheme was already well prepared for them and they pushed ahead with plans to implement the scheme as fast as they could. Briefly, in return for certain weekly contributions, the National Insurance Scheme provides financial relief for sickness, disablement and unemployment, together with pensions and other benefits. Also, last but not least, and whether you contribute or not, it was to provide a Health Service free to all, including visitors from any other country.

The National Health Service Act was passed in 1946, and the scheme started July 5, 1948. By the provisions of this Act the Minister of Health took control of practically the whole of the medical services of the country—hospitals with their staffs and even their endowments, the general practitioners and their practices, ancillary services, *i.e.*, dentists, opticians, pharmacists, nurses, ambulance services, *etc.*; the supervision of local health services, *i.e.*, medical officers of health, their staffs and *their* medical services. Thus he suddenly became a very powerful minister indeed. The Minister of Health, of course, is purely a political figure. He might go tomorrow and be replaced by another member of the Socialist party. If the Conservative party returns to power next year, and this contingency is unpredictable, he certainly would be replaced. Be that as it may, there are many—and I count myself among them—who deplore the appointment of any but a suitably qualified medical man to a post requiring technical knowledge paralleled in many respects by a similar parliamentary legal post such as that of Attorney-General. Our Minister of Health is not a doctor. Very few of our Ministers of Health have been doctors and the situation recalls to mind the Gilbertian one of

the admiral who must never go to sea if he wants to be the ruler of the King's Navy!

Now there is not the slightest doubt that the National Health Service was launched with indecent and irresponsible haste. It was a blunder of the first magnitude to rush it through in its then imperfect state, and the result could easily have proved to be a disaster. Even now, after 15 months, the situation bristles with the most acute difficulties. At its inception we were still a little dazed and shaken after a bitter and arduous war, and it was a moot point whether our physical and mental capacity, barely three years after such a strenuous ordeal, would prove equal to the task of tackling such a colossal undertaking in one fell swoop. "Hâtez vous lentement", says the French proverb and we were certainly prepared to make a start with the scheme. The B.M.A. was constantly reiterating that such a scheme should be introduced by evolution, not by revolution.

I have spoken of the political head of the health services of Britain. There are of course the permanent officials of the Ministry of Health to carry out the wishes of the Minister and to advise him. Of these permanent officials, there is a chief medical officer, two deputy chief medical officers and many others. They have done their best under very trying conditions. They have had a colossal amount of work to do and right nobly have they done it.

A word about the British Medical Association. Our B.M.A. is, I suppose, much like your affiliated Canadian Medical Association. Membership is not obligatory but most of us are members. On the other hand there are some (perhaps 20 to 25%) who are not members, and their position in all this may not have been altogether satisfactory. Now, in the sense only of its large membership, the British Medical Association is representative of the profession, and, for that reason, the Minister of Health himself decided that he would only negotiate terms for us through the British Medical Association. This seemed to be tacitly agreed upon, and so the Minister had to accept the situation.

Now I must say that there is widespread dissatisfaction in all ranks of the medical profession with their terms of service. The British Medical Association has worked very, very hard to secure the best terms possible but, unfortunately, they were up against a tough proposition in negotiating with the Government. What the B.M.A. did in the preliminary negotiations was to submit certain fundamental questions to us for our decisions and the B.M.A. chose to be guided by the results of our vote or plebiscite on these questions. But the fact remains, that the financial and some other terms are generally considered to be unsatisfactory, particularly in view of the fact that dentists obtained terms which have resulted in their average incomes in the Service being twice those of the doctors. Looking

back, I think the greatest single factor which influenced our acceptance of terms was that we had it in our hands to make or mar the whole scheme. Non-acceptance would have meant that the Act could not have been implemented. I think this responsibility weighed very heavily upon us and, although many thorny problems remained unresolved and in dispute, time pressed, and we felt we had to make a decision. We decided to accept.

I have discussed the position of the Minister of Health and his permanent officials. These permanent officials have constituted a permanent government department ever since the inauguration of the Ministry of Health in 1919 and implements the wishes of Parliament in all health matters, and that now includes the National Health Service.

To run the National Health Service the Minister first appointed a Central Health Services Council to advise him upon all general matters connected with the Service. This Council consists of 41 members, all of high standing in the medical profession, and of the 41, 15 are general practitioners—quite a good representation. This Council appoints various committees and presents an annual report by which the Minister should be largely guided in his annual review of the Service to parliament.

[After comments on the local health authorities and the hospital services, in which reference was made to the scheme for health centres, which has not yet been implemented, Dr. Magee turned to the general practitioner service.]

Now for the General Practitioner Service which, naturally, interests you most of all: the Central Health Service Council, which, as I previously pointed out, keeps a fatherly eye on the whole service, exercises only a remote control over the General Practitioner Service, and, for all practical purposes, can be ignored.

The real controlling body of the general practitioners is the Executive Council. For geographical convenience, there is roughly an Executive Council for each area where there is a local council or health authority, but of course the Executive Council is independent functionally. Actually, there are 138 Executive Councils in England and Wales as against 146 Local Health Authorities, due to the combining of certain small districts in the case of the Executive Councils.

An Executive Council consists of a Chairman, four lay members appointed by the Minister, and 20 other members elected locally, these 20 other members being proportionately representative of the various units engaged, i.e., general practitioner, dental, pharmaceutical, health authority, etc. Of these 20 other members of the Executive Council, seven are local medical practitioners. In each of these areas where there is an Executive Council, there is a purely medical committee called the Local Medical Committee. It concerns itself purely with the affairs of the local general practitioners and can advise and be consulted by the Executive Council on

such matters. But this Local Medical Committee has no administrative powers except the minor one of electing the seven medical members who will serve on the Executive Council.

The Executive Council is directly responsible to the Minister in regard to its administration. It contracts with the General Practitioner and pays him.

When the Service was introduced on July 5, 1948, all the doctors in practice at the time were automatically admitted to the Service if they applied. But, naturally, resignations and deaths occurred and these vacancies had to be filled. Now some areas were what is called "over-doctored"—too many doctors relative to the size of the population. Other areas were "under-doctored"—too few doctors relative to size of population. In order to control entry into medical practice subsequent to July 5, 1948, a Medical Practices Committee—a single central committee—was set up by the Minister. This Committee consists of a chairman who is a general practitioner and eight others. Of these eight, six are general practitioners. If a general practitioner dies or resigns, naturally his successor is appointed by the Executive Council from a list of applicants, but appointment must be approved by the Medical Practices Committee. If, for instance, the Committee is of the opinion that there is no room for such a replacement, they will not sanction an appointment and the patients of the deceased practitioner must choose another doctor in the district. Recently the Medical Practices Committee has published a list of localities showing particularly those which are under-doctored, and where a practitioner will, automatically, be granted permission to set up in practice; but of course that means that he will have to build it up from scratch. The Executive Councils chafe a little not only at some of the decisions of the Medical Practices Committee but at prolonged delays in giving them. Otherwise, it seems a very fair arrangement.

Now, doctors usually behave themselves fairly well and if they don't, I think a tolerant and often a blind eye is turned upon some of the minor transgressions of this hard-working section of the community. But occasionally, their delinquencies are such as cannot be overlooked. In such cases the practitioner must be dealt with by a special tribunal of three appointed by the Minister. This tribunal of three consists of a barrister (lawyer), a representative of the Executive Council and a general practitioner. If on the evidence submitted to the tribunal, the general practitioner is considered guilty of gross dereliction of duty from a National Health Service point of view, the tribunal can recommend to the Minister his dismissal from the Service. For what it is worth, there is an appeal to the Minister on this verdict. General practitioners don't like this. It was one of the bones of contention in preliminary negotiations with the Minister. General practitioners considered

they had the right of appeal to the High Courts. Our negotiations gave way on this point and many think that this concession should not have been made.

Now, as to the general practitioner and his work: under the National Health Service, the general practitioner still runs his practice much on the same lines as before but his practice is no longer his own. The Minister has taken it over at its gross certified valuation based on average receipts for the two years immediately prior to the commencement of the National Health Service. The Minister will pay about two and one-quarter times this value on retirement or death and continues to pay to the general practitioner an annual interest of $2\frac{3}{4}\%$ on this capital sum. As a rule the general practitioner's surgery (office) premises constitute part of his private house. His hours of consultation are much the same as before, say 9 to 10 a.m. and 6 to 7.30 p.m. He still has all his own expenses to pay such as replacement of medical equipment and instruments, heating and lighting, cleaning, telephone, engaging and paying a receptionist or clerk, and all car expenses. Owing to the difficulty or expense of obtaining domestic help, much of the non-medical and menial surgery work falls on the doctor's wife whose lot now is not always a very happy one and, in some cases, is not far removed from drudgery. If a doctor falls sick or wants a holiday, he must engage his own locum tenens and pay him. Good locums are scarce and fairly expensive. We feel that the general practitioner and his wife should not have to cope with such drawbacks in a properly run National Health Service.

The average general practitioner, before the Act, had National Health Insurance patients who were automatically transferred to his National Health Service list. All other persons in the country, without exception, who wish to join the Service, can obtain a form of application from any post office, complete it and present it to the doctor of his choice for acceptance. The doctor can of course refuse but he rarely does. A single-handed practitioner can take a maximum of 4,000 persons on his list. In towns and anywhere where a pharmacist is within reasonable distance of the patient's home, the practitioner does not dispense medicines, except urgent ones required when pharmacist's premises are closed. He gives the patient a prescription for whatever he may require. In rural areas where there is no pharmacist within reasonable distance, the practitioner dispenses his own medicine and is paid a fee for this. This fee is generally considered to be adequate. For each patient on his list the practitioner is paid an annual capitation fee of 18 shillings. The payment is spread equally over the four quarters, January 1, April, July and October. If he has to visit patients residing over two miles from

his surgery, he is paid a mileage fee which is also now considered to be at an equitable rate.

As over 95% of the population have now joined the Service, private practice can be largely discounted and they are gradually all coming in from dukes to labourers. The result has been anomalous. Practitioners living in the heart of an industrial or built-up area find no difficulty in getting their full quota of 4,000 on their list, but many good and clinically able general practitioners living in sparsely populated or superior residential districts who previously relied on the good fees they obtained from their better-class patients notice a difference. Although some stood out for a time and a limited few still do so, they have most of them trickled in and many of these unfortunate practitioners are hard put to it to get 1,000 or at most 1,500 on their lists. These practitioners are relatively suffering great hardships and there is no doubt that if this situation continues, the standard of efficiency and excellence in general medical practice could very rapidly fall.

Strictly speaking, a practitioner is on call every day and for the whole 24 hours, but reciprocal arrangements between neighbouring practitioners for afternoons, evenings and odd days are now gradually being established to their mutual satisfaction and benefit.

What is roughly the remuneration of an urban practitioner with a list of say 2,000? At a capitation fee of 18 shillings it is about £1,800. With overhead expenses he would be left with little more than £1,000. This is less than he was earning before the scheme started, and, ironically enough, it is occurring at a time when the cost of living and wages generally have been rising. In addition to all this, he is working harder than he was before. There is no doubt whatever that a large section of the community are making more use of the practitioner than they did before and the obvious inference is that they do so because the Service is free. The practitioner is now consulted for many more trivial ailments than before, and, with the free provision of spectacles, medical appliances of all kinds, hearing aids and even wigs, certification alone takes up quite a lot of his time. We general practitioners feel that the provision of a lot of these things borders in some instances on luxury, that a limit should be imposed and that only strictly necessary things should be free. For example, many patients requiring a truss ask for a recommendation for an elaborate type made by a particular firm specializing in this type. They will not put up with the ordinary type of truss.

A National Health Service patient can change his doctor at any time simply by taking his medical card with which he is issued on joining a doctor's list, to another doctor.

A practitioner also receives payment for certain supplementary services. If he wants to

do midwifery he must satisfy the Executive Council of his competence to do so. Otherwise he will not be allowed to practice it. Generally, established practitioners who have done midwifery satisfactorily over a period of years, are accepted without question, and, in rural areas, this is invariably the case. He is paid 7 guineas for each case, but that includes a minimum of two ante-natal attendances, attendance at confinement and for subsequent fourteen days, and one post-natal visit after six weeks. He is also paid for dental anaesthetics if he gives them (gas and oxygen, or pentothal, etc.). The Local Health Authority should pay him for vaccination and immunization; and it is another reflection on the indecent haste with which the Service was started that no payment has yet been made in respect of these services because it is still in dispute.

For practitioners in poor, sparsely populated districts and with, in consequence, very limited lists, special inducement payments are made. These do not amount to much. For those practitioners, especially young ones, who have not been long in practice or have just set up and must have time to work up a practice, £300 a year is allowed for a period up to five years but with a reduced capitation rate. For example, if a practitioner just starting has a list of 500 persons or even less, he could apply for the allowance of £300 per annum and, if granted, his capitation fee would be 15/2 instead of 18/. If the numbers on his list increase rapidly, he can revert to the ordinary capitation rate, but it is still true that the young practitioner just starting is often burdened with considerable initial expense, say in buying a suitable house, a new car, and all his medical and surgical equipment—no light matter in these expensive days.

Arrangements for removal of emergencies to hospital are quite good. In some districts there is an emergency bed bureau. You phone the bureau, explain the nature of the case (acute appendix or what not) give name and address of patient and they make all the arrangements, including collection by ambulance, etc. For other cases needing investigation or observation, the position is not so good and patients have often to wait many months for admission owing to shortage of beds, which itself is due to shortage of nurses and other staff. Urgent out-patients can be sent to hospital any day (for x-ray, etc.) but in the case of others an appointment by phone or letter has to be made and this often means a wait by the patient of anything from one to four weeks.

Six per cent of a practitioner's remuneration is deducted, and this, together with a contribution of 8% by the Government, goes towards the practitioner's pension. A practitioner can qualify for a limited pension after a minimum of 10 years' service. After a prolonged service he could on retirement get a pension equal to

more than half his annual income. The older practitioners do not think they have been treated very fairly in this respect. Many of them cannot qualify for a pension. There is also a special pension for practitioners' widows. Let me give you an example: a married practitioner, having done 40 years' service (25 to 65) and having made an average of £1,500 a year, would get £900 a year annual pension, a retiring grant of £900 and, if he died leaving a widow, she would get £300 per annum, *i.e.*, one-third of his pension. Actually, £1,500 ranks as a good income because in the case of a gross income of £1,000, only £650 counts as income for pensionable or superannuation purposes, the remaining £350 being reckoned as practice expenses. This means that, in order to qualify for this pension of £900 the practitioner would actually have to make an average gross annual income of about £2,300.

Under the old system, a practitioner could more or less choose the district in which he wished to practise because he could buy a vacancy. Now it is impossible to buy a practice in the National Health Service and, therefore, it is extremely difficult to settle in just the locality you want. The B.M.A. made a strong stand on this issue because the custom is an old and traditional one with us. The B.M.A., however, finally gave way on the point. The majority of practitioners think they should have retained the goodwill of their practices at least for a defined period.

Now, for some figures: 95% of the population have chosen doctors. About the same percentage of doctors have joined the Service; *i.e.*, about 18,000 doctors for 42,000,000 people, making the average list of a National Health Service general practitioner a little over 2,000.

The estimated cost of the whole service is about £300,000,000 or \$1,200,000,000. The hospital services account for more than one-half of this, which is to be expected. The original estimates were far too conservative and hopeful—only about half of the actual cost was estimated for. The hospital, general practitioner and pharmaceutical services kept within reasonable proximity of their estimates but the ophthalmic service cost seven times and the dental service three times the original estimates which shows what a mad scramble there has been for glasses and teeth—all free.

Over half a million prescriptions are issued daily, or, in other words, one person in 80 of the population gets a prescription from his doctor every day. The cost of prescriptions is about 2/9 per person per week. That is a lot. Five million free pairs of glasses have been supplied in one year, or one person in every nine of the population has received a pair of glasses in one year.

Eight million have seen a dentist, or one in every five. According to certain biased political

reformers, this sort of expenditure is justifiable and should not be interfered with. According to unbiased economists drastic cuts will have to be made in the costs of the Service. They question whether the economic state of the nation can bear the burden of a Service which costs so much.

Now when all is said and done, can it be said that the Service is a good one? Most decidedly it is, and for one very good reason, *viz.*, that it places at the disposal of everyone the expert care of their health freed from associated financial and other anxieties, factors which previously so often overshadowed the benefits derived.

Will the National Health Service be a success? It is too early to give an accurate prognosis but we all hope so, and, if it is not, it will not be for lack of effort on the part of the medical profession.

Is the National Health Service a good thing for the doctor? It could be, but up to now it has been a very mixed blessing. I think eventually our problems will work out. Alone amongst practically all the other participants in the National Health Service, the doctor stands out as the one who has not gained material benefit and who has, in many cases, suffered hardship. The patients have all benefited. There can be no question of that. The Minister of Health gathers the glory of having placed the Bill on the statute book. Moreover, his salary (£5,000) remains the same. The permanent officials at the Ministry of Health might have worked a little harder but their salaries remain unaltered and in lots of cases, are rising. The salaries of medical officers of health and other whole-time medical officers do not suffer but have been raised in many instances. Dentists are making more. Opticians are making more. Pharmacists are making more. Nurses are better paid. Only doctors earn, on the average, less, and yet they work harder and grumble very little.

I consider that the bearing of the medical profession throughout this first year of the National Health Service is the most encouraging feature of a somewhat bewildering adventure, and one which I record to you with justifiable pride. If there is one light shining out like a beacon on this whole panorama of the National Health Service and illuminating the road to success, it is, I venture to assert, that of the medical profession of Britain.

Now there are six points which I should particularly like to stress, *viz.*: (1) A National Health Service is an excellent thing. (2) The political head of the nation's health, *i.e.*, the Minister of Health, should be a suitably qualified medical man. (3) Political and governmental control should be reduced to an absolute minimum, and, as a corollary perhaps. (4) Doctors should have more control in the administration of their own Service. (5) In spite of the rather crude political cry that there should be no tax on sickness, a special contributory scheme by the patient towards the cost of treatment,

and/or the supply of drugs and appliances, especially for those who can afford it, would seem to be advisable, and perhaps eventually indispensable. Human nature being what it is, there is a tendency for many to get all they possibly can out of the scheme, for others to do so in a spirit of, shall we say, emulation of their acquisitive nature, and for a minority only, not to do so. (6) Private practice should be encouraged rather than discouraged.

In conclusion I might point out that we in Britain have tackled a National Health Service scheme on a scale such as no other country has attempted, and it is not only still standing up after fifteen months but is gaining strength.

Perhaps this may all go to show that the glorious spirit of adventure is not yet dead in us. In this as in other things we have made some bad mistakes, but I think I might add in no vain-glorious spirit, that, from long experience, we know how to retrieve ourselves. We are a dogged, stubborn lot of people, and, like our canine prototype, do not readily relinquish our hold on anything we have dug our teeth into. So I have every confidence that we shall eventually make of ours a model of what a National Health Service should be.

CLINICAL and LABORATORY NOTES

THE DETECTION OF MALIGNANT CELLS IN PLEURAL AND ASCITIC FLUIDS

Harold Gold, M.D. and Alan Carrie, M.D.

*Departments of Pathology, University of
Toronto and Toronto General Hospital,
Toronto, Ont.*

In preparing pleural and ascitic fluids for malignant cell examination by embedding and sectioning, it has been observed that if a natural clot be present the concentration of cells is much greater in this than in the precipitate obtained by adding 95% alcohol to these fluids. While an abundant precipitate is obtained by the latter commonly used method, it is composed mainly of albuminous fluid, only a few cellular elements being present. This suggested the idea of forming an artificial clot with thrombin, and on reviewing the literature the recent work of Hunter and Richardson,² and of Birge, McMullen and Davis,¹ came to our attention. The latter authors formed a clot in body fluids by the addition, first, of fibrinogen, and then of thrombin, and found that they were able to obtain good cellular concentration in the clots so formed.

We have attempted to concentrate the cells of pleural and ascitic fluids by forming a clot by the addition of thrombin only, as we felt that enough fibrinogen might be present in these

fluids to complete the process. To compare the cellular concentration obtained in natural clots, thrombin clots, and alcohol precipitates, each specimen of pleural and ascitic fluid was divided into two portions, after extracting the natural coagulum which was embedded in the regular way. From one of these portions an alcohol precipitate was obtained. To the other, a small amount of thrombin, sufficient to cover the tip of a scalpel blade, was added, and the clot so formed was embedded. The following table compares the concentration of cellular elements per high power field. This includes malignant cells, but excludes red blood cells.

It can be seen that there are fifty times as many cells in each high power field in the clot preparations, as in the alcohol precipitate. This

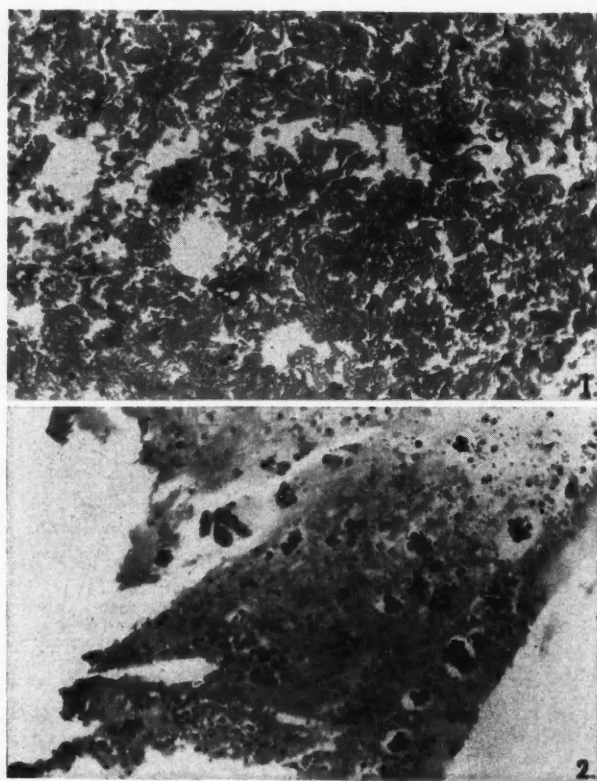


Fig. 1.—Albuminous precipitate. Only a few cells are encountered amidst the albuminous fluid; cell clumps as seen towards the left in this field, are unusual in these preparations (x 100). Specimen 12 A. Fig. 2.—Thrombin clot section. Here numerous cellular aggregates, and multitudes of singly occurring cells can be seen (x 100). Specimen 12 B.

aggregation of cells allows their size and shape to be compared, and reduces the number of fields that must be studied; thus the time required to report each specimen is lessened. Of the six specimens that were positive for malignant cells, only two would have been diagnosed as such by alcohol precipitation alone. One of the remaining four positive diagnoses was dependent on the production of a thrombin clot; in the remaining three cases it could be made from the natural coagulum. Occasionally in the absence

TABLE I.

<i>Surgical No.</i>	<i>Type</i>	<i>Thrombin clot</i>	<i>Natural clot</i>	<i>Alcohol precipitate</i>	<i>Result</i>
8451-45	P	200 cells/hpf.	None formed	1 cell/hpf.	—
8485-48	P	None formed	10 cells/hpf.	No cells seen	—
8494-48	A	None formed	More than 400	5 cells/hpf.	—
12-49	P	More than 200/hpf. Malignant cells	None formed	10 cells/hpf. Occ. susp. cell	Pos.
26-49	P	None formed	1000 cells/hpf.	5 cells/hpf.	—
53-49	P	None formed	200 cells/hpf.	None formed	—
89-49	P	None formed	5 cells/hpf.	1 cell/hpf.	—
175-49	P	None formed	75 cells/hpf.	No cells seen	—
176-49	P	75 cells/hpf. Malignant cells	200 cells/hpf. Malignant cells	No cells seen	Pos.
258-49	P	None	This specimen was received in Bouin's solution		
323-49	P	None formed	300 cells/hpf. Many malig. cells	2 cells/hpf. Neg. for malig.	Pos.
403-49	A	None formed	None	1 cell/hpf.	—
449-49	P	None formed	400 cells/hpf. Malignant cells	2 cells/hpf. Neg. for malignant	Pos.
603-49	P	Specimen was received 2 days late and was unsatisfactory for diagnosis.			
652-49	P	50 cells/hpf. Clumps of ca. cells	200 cells/hpf. Clumps of ca. cells	1 cell/hpf. Neg. for malignant	Pos.
861-49	P	400 cells/hpf.	40 cells/hpf.	5 cells/hpf.	—
900-49	P	None formed	400 cells/hpf.	25 cells/hpf.	—
960-49	P	500 cells/hpf.	None present	None formed	—
1019-49	P	None formed	100 cells/hpf. Malignant cells	5 cells/hpf. Malignant cells	Pos.
1039-49	P	None formed	400 cells/hpf.	3 cells/hpf.	—

of a natural clot, it is impossible to form an artificial coagulum with thrombin alone. In these cases, the method of Birge, McMullen and Davis, employing fibrinogen as well as thrombin, is being used.

SUMMARY

1. A clot, whether natural, or artificially produced by the addition of thrombin to pleural and ascitic fluids, is suitable for embedding in paraffin, sectioning, and staining with hæmatoxylin and eosin.

2. Such preparations give an excellent concentration of cellular elements, and present the cells to the pathologist in a form in which he is accustomed to examine them.

3. In this small series, the method has increased the cellular concentration fifty times, and has produced positive diagnoses in three times as many cases as were revealed by the alcohol precipitation method.

We are indebted to the Upjohn Company for providing the thrombin used in these experiments.

REFERENCES

1. BIRGE, R. F., McMULLEN, T. AND DAVIS, S. K.: *Am. J. Clin. Path.*, 18: 754, 1948.
2. HUNTER, W. C. AND RICHARDSON, H. L.: *Surg., Gynec. & Obst.*, 85: 275, 1947.

Micro-Determinations of Blood Iodine, Decker, J. W.: *Harper Hosp. Bull.*, 7: 321, 1949. In addition to the clinical study of patients with thyroid disease, and the determination of basal metabolic rate, cholesterol and cholesterol esters, other methods of determining the function of the thyroid gland now include a radioactive tracer study (including Geiger counting and iodine urinary excretion curve), and the determination of protein bound iodides and inorganic iodides of the blood. Earlier macro-methods of determining the iodine in the blood proved unsatisfactory since large amounts of blood had to be removed from the patient for a single determination. A new micro-method for the determination of protein bound iodine in the blood is in use at the Harper Hospital Research Division, and the following laboratory limits have been established as a result of a study of 200 patients: hypothyroid values range from 0.00 micrograms % to 2.00 micrograms % protein bound iodine; euthyroid values from 2.00 micrograms % to 4.00 micrograms %; hyperthyroid values from 4.0 micrograms % up.

INCREASING COST OF HOSPITAL SERVICES. — Surveys completed recently by the American Hospital Association have shown that the average operating cost per patient day in voluntary non-profit hospitals has risen from \$6.42 in 1939 to \$14.05 in 1948, *Public Health Reports*, 64: 1501, 1949.

THE CANADIAN MEDICAL ASSOCIATION**Editorial Offices—3640 University Street, Montreal***(Information regarding contributions and advertising will be found on the second page following the reading material.)***EDITORIAL****NEW REMEDY FOR RADIATION
ILLNESS**

SHORTLY after the advent of radiation therapy, radiotherapists noticed that some of their patients developed vomiting, malaise, prostration and lethargy. This syndrome has since been referred to as radiation sickness, and is often serious enough to necessitate the cessation of the course of therapy. Various theories have been suggested, disturbance of respiratory enzymes, a form of shock, deficiency in salt, histamine toxicity, but none of them proved, and various remedies used, vitamin B orally and parenterally, amphetamine, salt solutions intravenously, histaminase, desoxycorticosterone, and more recently, vitamin B₆ (pyridoxine). In 1947, Wells and Popp¹ of the Mayo Clinic reported on the intravenous use of pyridoxine in 200 patients and reported either good or excellent results in 64.5% of the series.

In this era of increased use of radiation therapy, with higher voltages, the announcement of a new remedy for radiation sickness assumes considerable importance. Beeler, Tillisch, and Popp² of the Mayo Clinic have recently released a preliminary report on the use of a new drug, dramamine (beta - dimethylamino - ethyl benzohydryl ether 8-chlorotheophyllinate), in radiation sickness. In a series of 83 patients who had developed either moderate or severe radiation sickness, the results were, excellent 25.6%, good 53.7%, fair 4% and poor 13%. In a control group receiving a placebo the results were, excellent 0%, good 13%, fair 39.1% and poor 47.9%. Side effects were drowsiness in 15 and bad taste in 8.

Dramamine is a drug with antihistaminic properties, related to benadryl and pyribenzamine. Gay and Carliner³ of Baltimore first investigated its properties regarding motion sick-

ness. This new drug received a well controlled study with 418 soldiers abroad the United States Army Transport *Ballou* in a rough crossing between New York and Bremerhaven, and was pronounced to be both a preventive and a cure for seasickness. The Mayo Clinic group became interested in the striking similarity between the symptoms of motion sickness and those of radiation sickness, and this prompted their investigation of the use of dramamine in the latter condition. At present, they favour the theory that dramamine exerts a specific depressant action on the vomiting centre, secondarily improving the other symptoms of radiation sickness. They suggest that the combination of dramamine and pyridoxine in the more severe cases will give the radiotherapist an additional agent for the control of radiation sickness.

This new use for dramamine is another example of a drug developed for a specific purpose finally being applied in the therapy of other syndromes.

HAZARDS IN SHOE FITTING BY X-RAY

THE use of x-rays in the fitting of shoes has become a widespread practice. But it involves potential dangers and it should receive careful consideration. The so-called x-ray fitter which is found in many large departmental stores consists essentially of an x-ray tube and fluoroscopic screen, suitably housed. The machine is usually fitted with a push button automatic timer which can be set for any predetermined time, and in actual use twenty seconds appears to be the common setting. But repeated exposures can be made, which is an important point.

An interesting study of the radiation exposure from these machines has been made by Chas. R. Williams, of Boston.¹ He has investigated the foot dosage, the wall leakage and the scattered radiation from a variety of these shoe fitting fluoroscopes. As he points out, both the customers and the sales force are exposed to the danger of these radiations. Since the shoes of children need most frequent fitting they are the most likely to suffer. The direct radiation occurring with the examination will of course vary with the length of exposure and its repetition.

1. WELLS, J. J. AND POPP, W. C.: *Proc. Staff Meet. Mayo Clin.*, **22**: 484, 1947.

2. BEELER, J. S., TILLISCH, J. H. AND POPP, W. C.: *Proc. Staff Meet. Mayo Clin.*, **24**: 477, 1949.

3. GAY, L. N. AND CARLINER, P. E.: *Bull. Johns Hopkins Hosp.*, **84**: 740, 1949.

1. WILLIAMS, C. R.: *New England J. Med.*, **241**: 333, 1949.

To govern this the New York City Health Department have specified the maximum permissible dosage per exposure, and also the number of times it may be repeated in a year, this being limited to twelve.

L. H. Hempelman² writing in conjunction with Williams comments on the types of radiation injuries which might occur from the uncontrolled use of these machines, amongst them being interference with the growth of children's feet from the effect of radiation on young bone, as well as radiation burns.

There seem to be no reports of any actual instances of injury from this source, but its potential dangers remain. It is questioned by some whether these machines are essential for good shoe fitting or are simply part of sales promotion technique. They can only show the bone shadow and may therefore be misleading as to the amount of space actually taken up by the foot. Indeed, experienced chiropodists hold that x-ray shoe fitting may be the source of some painful foot disorders. X-ray apparatus always has inherent dangers and the value of these machines in the fitting of shoes hardly justifies the risk they involve.

EDITORIAL COMMENTS

National Health Week

There has been an increasing tendency in recent years to set aside a week for some worthy cause. Thus we have Fire Prevention Week, Education Week, etc. Six years ago, the Health League of Canada, the publishers of *Health* magazine, held their first annual "National Health Week". This year they have designated January 29 to February 4, 1950. The purpose of National Health Week is to make the public realize the value of health, both public and personal, and to serve as a reminder of the services which the medical profession has to offer.

If the present medical knowledge and armamentarium were efficiently and properly utilized, much sickness and suffering could be eliminated. It has been the problem of the medical profession, is now, and probably will continue to be, how to present their services to the public in the most suitable manner. This is one of the most urgent questions in the mind

of the medical profession today, and many experimental schemes are in operation throughout the world.

The public tend to put off seeing a doctor until compelled to do so. How often during a day's work do we say, "If only I had seen this patient sooner". In spite of pre-employment examinations, insurance examinations, etc., it is remarkable how many persons reach adult life without having been examined by a doctor. Many persons are reluctant to consult a doctor for fear he will find something wrong, or that he will prescribe some treatment which they cannot afford or find distasteful.

In view of these facts, there has been an increasing tendency for the medical profession to carry their services to the public, instead of passively waiting to be consulted. For instance, from September 21, 1949 to January 14, 1950, an intensive x-ray survey has been conducted in Boston, similar to surveys which have been completed in other American cities, during which time the goal is to obtain a chest x-ray of every person of 15 years of age or over, who lives, works, or transacts business in Boston. Similarly, the American Diabetic Association, from October 10 to 16, 1949, sponsored a drive to detect the estimated one million unknown diabetics in the United States, and concurrently, a drive to educate the public regarding the ravages of untreated diabetes mellitus. Other examples are, National Immunization Week, recently sponsored by the Health League of Canada, Cancer Detection Week, etc. It will be noted that the key figure in all these campaigns is still the family physician.

Thus, National Health Week serves a real purpose and deserves the utmost support of the medical profession. J.H.D.

ACTH In Asthma

It is too soon of course to appraise the value of ACTH in the treatment of disease. At the moment it is being tested in a very wide variety of conditions, amongst which allergy has been prominent. In the present issue Dr. Bram Rose reports results in a series of six cases of severe asthma. While the time element is most important in such cases, there is no doubt of the striking early relief produced by ACTH. Along with this paper may be placed a report by Bordley and others* on the use of ACTH in a series of similar cases: there was evidence that this substance was capable of blocking hypersensitive reactions and encouraging results were recorded in the changes produced in polyps. The outlook is promising, but prolonged observation on the use of ACTH in asthma has yet to be carried out.

2. HEMPELMANN, L. H.: *New England J. Med.*, **241**: 335, 1949.

* J. E. Bordley et al.: *Bull. Johns Hopkins Hosp.*

Rh Hapten

Preliminary reports* have appeared regarding the use of a new preparation, Rh hapten, in the treatment of Rh negative sensitized mothers and erythroblastotic babies. Rh hapten is a liquid substance, and is prepared from laked red cells of Rh positive blood. It is insoluble in water, but soluble in warm 95% alcohol, in ether, chloroform, and acetone. Clinically it has been used in the form of an alcoholic solution.

In sensitized Rh negative mothers showing an increased titration for Rh negative antibodies, Rh hapten has been injected intramuscularly, resulting in a definite lowering of the level of Rh antibody in the circulating blood. In the treatment of 30 sensitized mothers and 27 erythroblastotic infants, encouraging results have been obtained. Further study may reveal that Rh hapten is a valuable preparation in the treatment of Rh sensitization.

J.H.D.

The Royal College Presidency

We learn with great pleasure of the election of Dr. D. Slater Lewis to the Presidency of the Royal College of Physicians and Surgeons of Canada. This honour is yet another recognition not only of Dr. Lewis's high professional standing but of his constant devotion to the interests of Medicine. Within our own Association his record of service stands unexcelled amongst those who have spent themselves in long years of self-sacrifice. We would like to extend to him our warm congratulations on this his most recent honour.

"Circulation"

We welcome to the field of medical literature a new periodical, *Circulation*, the new official journal of the American Heart Association, which is to have its first issue in this month, January, 1950. Thomas M. McMillan, M.D., formerly the Editor-in-Chief of the *American Heart Journal* continues in the same capacity with this new publication. With the December, 1949, issue the American Heart Association terminates its sponsorship of the *American Heart Journal*. *Circulation* will be published in a new, larger format which will allow for printing 25% more material in every issue. It is felt that this larger official journal is required to keep pace with the advances in the field of cardiovascular diseases and to give a balanced account of all phases for specialists, clinician, and investigator.

* Carter, B. B.: 61: 79, 1949.

MEDICAL ECONOMICS

ORGANIZED MEDICINE IN A NATIONAL HEALTH PROGRAM*

F. W. Jackson, M.D.

Winnipeg, Man.

Just over a year ago the first part of a complete national health service, namely, the National Health Grants program, was brought into operation. This program, as I am sure you all know, had been announced in Parliament by the then Prime Minister, the Right Honourable Mackenzie King, on May 14, 1948. The announcement gave in detail its nature and the amounts and purposes of the various grants that were to be made to the provinces. These grants in total made available to the provinces more than thirty millions of dollars a year. The Prime Minister in his announcement, when speaking of the Survey Grant, stated that the purpose of this grant "is to assist the Provinces . . . in planning the extension of hospital accommodation and the proper organization of hospital and medical care insurance".

Taking into consideration Mr. King's statement in respect to the Grants Program, I am sure you would like to have me review briefly the progress to date with particular reference to its value in the field of medical care. The first project received from a province was under the Survey Grant, and was considered and approved on August 25, 1948. As at August 26, this year, there have been approved by the Minister 1,213 projects submitted by the provinces. In the fiscal year ending March 31, 1949, the provinces had requested allotments of monies amounting to over fifteen millions of dollars. To date, in the first five months of the present fiscal year, the provinces have submitted and have had approved projects under the various grants, including projects continued from 1948-49, totalling in all almost seventeen millions of dollars. We think that the program is proceeding satisfactorily.

The particular grants which are of most interest to organized medicine are, naturally, those having to do directly or indirectly with the improvement of medical practice. The first—and probably the most important of these—is the Hospital Construction Grant.

Our records indicate through the number of hospital projects that have already been submitted and approved that there have been completed since April 1, 1948, or are under construction, a total of 13,746 hospital beds. This represents nearly 25% of the total number of new hospital beds which it is estimated are required to take care of the present hospital needs of Canada. The inauguration of the

* Address to the New Brunswick Medical Society, Fredericton, August 30, 1949.

Federal Hospital Construction Grant has insured the provision of both federal and provincial funds to stimulate the construction of hospitals.

A survey of the hospital projects already presented indicates that approximately 40% of the total cost of hospital construction going forward at present in the Dominion of Canada is being provided from federal and provincial tax funds. If we were able to ascertain the total amount of municipal contributions involved in this program, I am sure we would find that the percentage of the cost of building hospitals which is paid from taxes would be well over 60%. It might also be added that the provision of grants in aid for the building of new hospitals has required that every province in Canada comply with a minimum standard for hospital construction. This will go a long way towards ensuring that all hospitals being built will be of a reasonably high standard, and will help to ensure adequate facilities for medical care.

Another grant which is of particular interest to organized medicine is that in respect to professional training. I might say that professional training of personnel is not only allowable under the Professional Training Grant but that provision is made, also, in all other grants to train people in the special fields of the grants, provided, of course, a province has not sufficient funds in its Professional Training Grant to take care of all training. To date provision has been made for the training of 216 medical personnel in the various fields covered by the Grants Program. These include the training of public health officers, hospital administrators, radiologists, pathologists, psychiatrists, bacteriologists, specialists in tuberculosis, in pædiatrics, cancer, obstetrics and, in fact, in almost all fields of medical practice.

All medical personnel working in the various specialized types of medical care programs, such as mental disease, tuberculosis, cancer, crippled children, etc., have had their work facilitated by the provision of the most modern types of equipment required in these special fields. Provincial laboratory facilities have been materially improved. Thus, directly or indirectly, organized medicine through its members is benefiting from nearly every project which is approved by the Minister.

In respect to the faculties of medicine in the various universities across Canada, it is interesting to note that, under the Public Health Research Grant for the present fiscal year, they are receiving financial assistance for research totalling approximately \$135,000 out of the \$205,000 available this year.

The Minister, the Honourable Paul Martin, in speaking to the Canadian Public Health Association at their annual meeting in Vancouver, last year, stated: "When the present program is well under way, it will then be possible to proceed with the implementation of a national plan for hospital and medical care insurance."

If we are going to have a properly organized and co-ordinated service, it is essential that we have the proper foundation, which is the Grants Program, well established before we proceed with any and all other steps which may be thought desirable in a complete health service for the Canadian people.

At this point it is necessary, I think, that we should again bring to your attention the place of the Federal Government in the provision of health services. As we all know, under our present constitution, no Dominion-wide health program can be administered at the federal level. All matters pertaining to health, with certain minor exceptions, fall within the jurisdiction of the provinces. It is, therefore, apparent that at the moment the only way in which the Federal Government can assist in establishing better health care is by providing assistance, financially and otherwise, to the provinces in order that they may themselves provide the services to their people. As the Prime Minister, the Honourable Louis S. St. Laurent, said in a radio address last December: "The Federal Government *should* help with a sensible and practical nation-wide scheme whenever the provincial governments can reach a satisfactory agreement for Dominion-Provincial co-operation. But it is up to the *people* and the *government* in each *province* to take the initiative in working out health insurance plans in line with their local conditions and their traditions."

It is logical to suppose that assistance to the provinces by the federal government for any new steps to improve our present health facilities which may seem desirable in the course of the next few years will be brought forward on a basis similar to the present Health Grants Program; in other words, that the Federal Government in effect will say to a province, "If you want to establish province-wide hospital insurance or medical care insurance, we are prepared to pay so much per capita towards the cost of the same," and that the province, under certain general rules laid down by legislation or Order-in-Council, would itself organize and administer the program just as it now does the programs being inaugurated by federal funds through approved projects under the various health grants. This, of course, is as it should be, because it has been repeatedly stated by the Government of Canada that it has no intention of interfering in any way with the complete autonomy of any province in the field of health.

From my thirty odd years' connection with organized medicine, I know it has always been *their* fear that any participation by Government in the provision of medical care might mean, to some extent at least, regimentation of the medical profession. The Minister of National Health and Welfare, the Honourable Mr. Martin, has repeatedly stated that, in so far as the Federal Government is concerned, there

will be no attempt to interfere with the rights of organized medicine or to seek regimentation of the medical profession.

It is a great satisfaction to me, personally, and I am sure to all organized medicine, to know that in every province of Canada organized medicine has, either directly or indirectly, a part in the surveys now going forward. Organized medicine *will*, therefore, have a voice in the way each province may decide to provide their people with a complete health service. In a good many of the provinces also, the survey groups are directly connected with the present operation of the Grants Program and, so, organized medicine is playing a really significant rôle in pointing out the most effective methods by which monies now available can be used for the improvement of Canada's health facilities.

All of us in Canada (and I include organized medicine, the thinking citizen, public health officials, and governments themselves) have, I believe, the same objective, and this is to provide the best possible health care for every citizen of the Dominion. I am sure from the last official statement of the Canadian Medical Association that this is correct in respect to what organized medicine thinks. There should not be any insurmountable difficulties in providing the Canadian people with just this type of service. The public, organized medicine and government should be bound together in a common endeavour devoted to service to the public at large and to all Canadian communities. I am confident that no group would want to profit in this united effort by exploiting another. There cannot be any form of intervention between the doctor and his patient which would prevent the patient from receiving all the service he needs, where he needs it, and when he needs it. With the knowledge and experience which we can commonly pool, we *can* devise a plan for a complete health program in every province, which will ultimately provide the service we desire and which will be satisfactory to all.

There are many problems, of course, which have to be solved. One of the greatest of these is the present uneven distribution of medical services, whereby cities have fairly adequate medical personnel while many rural areas are almost completely without any health service. In a recent western trip I found one district containing about 5,000 people where a hospital has just been completed. It will be operated by the Red Cross. At the moment there is no medical practitioner in the community and it would not seem likely that anyone will be obtained in the immediate future. This particular situation (and I am sure it will be multiplied many times over, particularly in Western Canada, as hospital construction projects go forward) must give us cause for real concern.

It seems to me that there are three main reasons why medical graduates do not locate in rural communities: (1) the scarcity of the amenities of life in country areas; (2) the lack of facilities for the scientific practice of medicine; and (3) the changing attitude of medical graduates toward rural medical practice. The first of these is, of course, the responsibility of the local community requiring medical service and does not have a place in this discussion, although it does have a very definite bearing on the whole problem of rural medical care. The second is the responsibility of the local community and/or the provincial government. The third is the responsibility of organized medicine through our medical educational system.

I have noted year by year the growing reluctance of graduates to begin practice as rural general practitioners. Individual interviews with the members of the graduating class at the time of the final examinations indicate that the majority of students desire to join clinics or to go into one or another of the specialties. The value of the general practitioner in the whole scheme of caring for the health of our people seems to have been forgotten.

The major factors in the disinclination on the part of students to become general practitioners would appear to be, first, that too much consideration may be given to scholastic ability in the selection of students to enter medical school and not enough to the integrity and general social outlook of the prospective medical man.

Second, the present methods of student instruction tend more and more to point the student toward entering one of the many specialties now available. This becomes most apparent in the intern year, especially in the teaching hospitals where practically all the instruction received is from specialists in the various fields. Hospitals must share some of the responsibility for this situation as there is constant pressure to persuade the young graduate to stay on for an extra year, often giving him an opportunity to limit his further instruction to one field of medical practice, and rarely is this the field of rural general practice. All organized medicine should be concerned with this problem.

In respect to the adequacy of medical personnel in the Dominion a careful study of the latest edition of the Survey of Physicians in Canada as at September, 1948, gives a far from encouraging picture. It shows that, although there had been a 2.4% increase in our population during the period under study, there had only been a 0.7% increase in the total number of physicians.

A more detailed analysis of the statistics in the report indicates that if doctors are expected to retire at 65 years of age, we are barely taking care of our yearly physician wastage, even providing the graduating classes continue at the high level estimated for the years 1949 to 1952 inclusive. I believe indications point to the

likelihood of at least some temporary decrease in graduates after 1952.

When one tries to estimate the number of medical personnel needed to provide a complete health service, difficulty arises. I think we have to analyze the number of physicians presently registered in Canada. As near as can be estimated, the total, as at September, 1948, was 13,373. This includes, of course, physicians in public health work, Government service such as tuberculosis, mental disease, Department of Veterans' Affairs, and hospital administration. If we deduct these groups from the total physicians in Canada, we find there are only 6,570 general practitioners and 3,085 specialists, a total of 9,655 physicians to provide medical care for the general population.

On the basis of the formula used by the International Health Division of the Rockefeller Foundation in a study recently made in one of the provinces, we require for all of Canada 8,666 general practitioners and 4,650 specialists. This indicates that our shortage might be something over 3,600 physicians. Personally, I think their population unit for a general practitioner is too low. I believe from the experience in Western Canada that the family physician can take care of 2,000 persons rather than 1,500, as the Foundation yardstick suggests. Using this figure, 2,000 for a general practitioner, the total shortage at the moment for medical care alone would appear to be approximately 1,450. To this we must add, for the expanding work in public health, hospital administration, tuberculosis control, mental disease and other public health problems, probably at least another 500, making a total shortage of nearly 2,000 medical personnel to give a complete health service for all the people of Canada.

The provision of the required medical manpower to make possible complete medical care for all our people is, in my opinion, the responsibility of, and can only be undertaken by, organized medicine through the various faculties of medicine of our Canadian universities.

The shortage of personnel, of course, also extends to the nursing field. It is not much use for the provinces to build more hospital beds unless they can be assured of the necessary nursing staff to operate them. Fortunately, the training of nurses is of shorter duration than that of medical men, and several of the provinces are working on plans which should, when they are brought into operation, assist in making the necessary nursing personnel available for the new hospitals being constructed. I believe that much more use will be made of the so-called "practical" nurse or nurse's aide, and, it appears that a satisfactory nurse in these limited fields can be developed with a year's training. Some of the provinces have these training courses in operation, and more have them under consideration. However, there is a real need for serious consideration as

to what may be done in the training program of registered nurses to provide adequate senior nursing staffs for all our hospitals.

We know also that dentists are in very short supply and, until we can get more dentists trained, it will not be possible to provide in most of the provinces an adequate service even for children.

I have purposely not attempted in this short discussion to enter into the economic side of a complete Health Service, because I do not think any of us are at present able to estimate accurately what such a program in its entirety will cost. We know of the increase in hospitalization under prepayment plans through the excellent services being provided by the Blue Cross across Canada. The experience in Saskatchewan more than substantiates this. We also know the increased amount of attention requested by people under any prepaid medical plan, be this voluntary or compulsory. On all these counts it would seem to me that we have not the knowledge to be in a position at this moment to accurately estimate the total cost of a full complete program of health care. I believe our approach to the problem should be step by step, taking care of first things first, and working as expeditiously as we can towards the time when, brick by brick, we shall have completed the whole edifice of an adequate Dominion-wide health service.

In conclusion, might I refer to a personal incident that occurred in Manitoba twenty-one years ago. This was brought to my attention by a clipping from the *Winnipeg Free Press*, which I have amongst my possessions. This article was written some five years ago at the time the Manitoba Health Plan was announced. It stated that I entered public health because of the things I saw and did not see when making a health survey in the Province of Manitoba for the first Minister of Health and Public Welfare appointed by the Manitoba Provincial Government. That was only part of the reason for my leaving general practice and entering public service.

Organized medicine itself—both the Canadian Medical Association and the Manitoba Medical Association—materially assisted in making it possible for me to enter public health, because they subsidized the salary the Health Department in Manitoba was prepared to pay me at that time by appointing me Secretary of the Manitoba Medical Association on a part-time basis. For this, I thank them, because it has given me the opportunity of watching, over a period of twenty years, the rapid progress in the field of improved health services all across Canada. Now I think we can see, in the not too distant future, the time when there will be in operation a complete health service for all our people, including hospital and medical care insurance, organized and operated by the provinces through the co-

operation of all parties concerned. Our objective must be to see that everything medical science has to offer for the promotion of health, the prevention of disease, and the cure of illness will be *readily* available to *every* citizen of Canada, no matter *where* he lives, or what his *economic status* may be. There can be no higher endeavour for Canadian medicine than to strike out boldly in new directions when the ultimate goal is better service to humanity.

ASSOCIATION NOTES

WORLD MEDICAL ASSOCIATION— ANNUAL ASSEMBLY 1949

Medical ethics, postgraduate education and social security were among the chief topics discussed at the third annual assembly of the World Medical Association which was held at the British Medical Association House, London, from October 11 to 15, 1949. Fifty-six delegates representing the national medical association of 28 countries were present; in addition to the delegates, the meeting was attended by observers from WHO, UNESCO, ILO, the World Federation for Mental Health, and various international medical organizations. The following countries were represented: Australia, Austria, Belgium, Canada, Columbia, Cuba, Denmark, Eire, Finland, France, Great Britain, Greece, Iceland, India, Italy, Luxembourg, Netherlands, Norway, Pakistan, Peru, Philippines, Portugal, South Africa, Spain, Sweden, Switzerland, Turkey, United States of America. Canada was represented by two delegates, Dr. T. C. Routley, Secretary of the Canadian Medical Association, who served as Chairman of the Council for the past year, and Dr. W. Magner, past president of the C.M.A. The languages spoken at the assembly were English and French, with occasional Spanish. Dr. Gérin-Lajoie, of Montreal, also a past president of the C.M.A., did excellent work as translator for the assembly.

The WMA is an unofficial voluntary organization representing the interests of medical men and women throughout the world through their national medical associations, and since its birth at the first annual assembly in Paris, 1947, much progress has been made. The WMA does not dictate, but serves as a liaison between national medical associations. Unlike WHO, UNESCO, and UNNRA, the WMA has no political connections and an attempt is being made not to duplicate existing facilities. At the opening meeting the outgoing president Professor Eugene Marquis of France referred to two large pieces of work which the Association had already accomplished; its declaration on the punishment of war crimes by medical men, and the Declaration of Geneva, a modern

version of the Hippocratic Oath. He then moved confirmation of Dr. Charles Hill, Secretary of the British Medical Association, as incoming President of WMA. Dr. E. L. Henderson, president-elect of the American Medical Association, was elected president-elect of WMA.

The financial support of WMA is obtained in part by an annual subscription from each of the participating national medical associations, but these subscriptions are not adequate to meet the annual budget of the WMA, which has been set tentatively for 1950 at \$75,700.00. At the first Assembly in Paris in 1947 the United States delegation offered to subscribe \$50,000.00 a year for 5 years to get the WMA on its feet. The offer was accepted, and a United States Committee was formed as a non-profit organization to raise these funds. The American Medical Association, as well as certain well-recognized pharmaceutical houses, and individual doctors in the United States have contributed \$12,000.00.

The preparation for the assembly was the responsibility of the Council, of which Dr. T. C. Routley was the Chairman for the past year; meetings were held in Geneva, Madrid, and London during the year. In presenting the report of the Council, Dr. Routley wished to make it clear that it was the view of the Council that the Association should not attempt to propose to any member-country how it should conduct its affairs; its function was to make known to all countries the information which reached it and to endeavour so far as possible to maintain international standards of medical practice.

Dr. Routley went on to indicate certain proposals, all of which were adopted, for the future program of the Association. The first was a proposed conference for the co-ordination of scientific medical organizations. He said that the Council was not unmindful of the activities of UNESCO in this field, and had no desire to overlap, but what they had in mind was something beyond the scope of UNESCO activities. The Council also proposed to make a study of pharmaceutical practices, including the newer therapeutic agents (the sulfonamides, penicillin, streptomycin, etc.), the extent to which these agents were available in different countries, any government subsidies affecting their distribution, and any restrictions on prescribing these agents, either in private practice or social security schemes.

A further study proposed concerned hospitals, their types (government, private, teaching, etc.) in each country, the number of hospital beds in relation to the population, the availability of hospital facilities, and the control and financial support of hospitals.

Further, a study of the status of the medical profession, especially in relation to medical manpower and membership of the national associations in the different countries was proposed.

This would be supplementary to a study which the Association had already published, concerning 23 countries, dealing with medical manpower and other subjects.

On the first day an International Code of Medical Ethics, which incorporated the Declaration of Geneva, adopted by the general assembly in September, 1948, was discussed, as well as a code setting out the duties of doctors in general and to the sick. This code had been suggested at the 1948 assembly and had been studied by a special committee for the past year. The code contained no more than general rules for the practice of good medicine. A lively debate followed, with several amendments being proposed, finally the document was approved by the assembly and it was agreed that it be left to national medical associations to modify the wording of the code, providing that any alternative wording conformed to the principles which the code set out.

On the second day of its meeting the assembly addressed itself to a report on postgraduate medical education and specialist training. The report—a long and exhaustively tabulated document—set out the results of a questionnaire to which the national medical associations in 32 countries had returned answers concerning the existence and establishment of standards for specialists, the period and type of training, details of examinations, certificates, schools, faculties, recognized specialties, and the opportunities for advanced education for doctors not interested in becoming specialists.

Dr. J. A. Pridham, in submitting this report, said that it embodied the results of work which only the WMA could have undertaken. The study had shown that the level of postgraduate education differed widely in different parts of the world, and so did the facilities for such education. He suggested to the assembly that here they had the possibility of doing something really valuable. It did not suffice for one country to go ahead in this field and leave other countries in a backward state. In view of the universal ethical standard which they had proclaimed, doctors in the more advanced countries should surely assist other countries to raise their own standards of education and practice. In that way they would be doing something to fulfil one of the main objects of the WMA—which was the maintenance of world peace.

The last day of the assembly, October 14, was devoted to a discussion of a committee report on social security. Dr. Hill, Chairman of the committee said that wherever schemes of social security, embodying medical services, were being evolved, the medical profession was presented with the problem of preserving—in the interests not of the medical profession but of the public—the essential freedoms of the profession in the conduct of its work. Bearing in mind that it was not the rôle of the WMA to

dictate to its member-associations the line they should take in dealing with schemes in their respective countries, his committee had begun the preliminary work of the survey, and the report now presented was a factual summary of the conditions in 24 countries. Governments were closely associated in these matters, each government making a careful study of what was going on elsewhere. Information was passed from government to government, and because of this intergovernmental activity it was only right that the medical profession in each country should be informed of what was going on elsewhere. The function of the WMA was to provide an international forum for the expression of the views of the profession on relations with governments. It was important that the profession should be informed of the trend of governmental activities, should maintain a wise vigilance, and should be prepared to resist tendencies which threatened the freedom of the profession.

Following the presentation of the committee's report on social security, comments were offered by several delegates on progress in their countries. Several delegates were of the opinion that the British National Health Scheme was not the final solution to the problem of providing medical care. Dr. Paul Cibrice, France, considered that the capitation method of paying the doctor put him at the mercy of his patient. Dr. W. Magner said that while the Canadian Medical Association approved the principle of contributory health insurance it would oppose an Act modelled on the British Act. Further, Government subsidies for medical care of the lower income group were welcomed. For the United States, Dr. W. Cline told how in his country the medical profession were developing and enlarging the voluntary insurance system, and considered that the care of the indigent was the responsibility of the local community. Dr. S. C. Sen gave some idea of the tremendous problems facing India when he observed that for a population of 350 million there were at present only about 50,000 qualified doctors.

The transactions of the assembly are published in the *WMA Bulletin*, of which Dr. Morris Fishbein, editor of the *Journal of the American Medical Association*, is the editor. This Journal is the first medical publication to be published simultaneously in three languages, English, French, and Spanish. Three numbers have now been issued, and a proposal is being considered that six numbers be issued each year instead of four.

The assembly, which meets in the United States in 1950 and in Sweden in 1951, had three invitations for 1952, from Canada, Cuba, and Greece. The choice of venue was left to the Council. In the closing proceedings, Dr. E. L. Henderson proposed a vote of thanks to the British Medical Association for the ar-

rangements it had made for the assembly, to Dr. Charles Hill for the excellent way he had presided over the assembly, and to the interpreters for their able assistance. The assembly meets again in October, 1950.

DIVISIONAL MEETINGS OF THE C.M.A.

J. F. C. Anderson, M.D.

*President, Canadian Medical Association,
Saskatoon, Sask.*

[The following extracts are taken from the report prepared by the President of the Association, after his regular presidential tour of the Provinces in 1949.]

It was interesting to note differences in the Health Insurance awareness and activity in the various provinces. In some, there would appear to be little present demand on the part of the people for any government-sponsored Health Insurance scheme, with little or no advocacy from their Provincial Government, and hence no real general concern throughout the profession in those Provinces. I would hasten to assure you, however, that there is a definite core or group, in each Division, alert to the probable spread of medical socialization demands in their provinces.

The situation, as one travels west, is very different. Here groups representing the people have actively advocated Government medical plans.

The Governments are actively interested in Government Health Insurance and in the Province of Saskatchewan, are definitely committed to its introduction. The professions in both British Columbia and Saskatchewan seem much more ready to accept some form of compulsory Health Insurance, and have already accepted compulsory hospitalization in principle and in practice (although objecting to its timing and some of its administrative practices.)

Dr. Fred Jackson, Director of Health Insurance Studies, Department of Health and Welfare, Ottawa, addressed the New Brunswick Division on the Federal Health Grants, again emphasizing the ultimate objective of Health Insurance, possibly three years distant; again he made known his belief in Government departmental administration rather than in Commission Administration. He seems anxious to co-operate and secure the support of the organized medical profession. The New Brunswick Division passed a motion increasing their Divisional fee to \$50.00 in order to provide funds for the employment of a full-time secretary for themselves, or to be shared with the other maritime divisions. Once again the New Brunswick Division supported a motion providing 100% membership in the C.M.A.

Dr. McMillan presented the report of the Health Grants and Survey Committee of the

Prince Edward Island Division, which has been under the chairmanship of Dr. Shaw. This committee has been exceedingly active and has secured excellent co-operation with the Government.

The Nova Scotia Division has accepted a governmental proposal of 75 cents per person per month, to provide home and office care to the welfare group.

Maritime Medical Care now has 7,000 subscribers and is growing satisfactorily.

General concern is evident in respect to the financial position in the Swift Current Region due to the repeated crop failures in that area. The scheme is without outside financial aid. The problem of outside referrals to specialists has not been solved, (there being practically no consultants within the region). The Saskatchewan Division went on record as unanimously opposed to the expansion of health insurance on the basis of local health regions as exemplified in the Swift Current Health Region, because of the artificial barriers created to the availability of services, because of the dependence on local economic conditions, and the demand for unlimited services with limited funds.

Dr. G. D. G. Howden, a General Practitioner from the Swift Current Region, in a prepared paper, pointed out the excellent co-operation between the Regional Board and the doctors and hence the favourable circumstances in presenting their case. However, "The people as a whole have not been educated to the fact that this is Health Insurance and not Free Medicine. Until this is accomplished, together with the application of certain restrictions, the demand for luxury medical care will outstrip the ability of the region to finance it unless Government assistance is forthcoming, or this financing is done at the expense of the doctors."

In Manitoba, Dr. Routley and myself had the opportunity of attending the General Practitioner's Meeting of that Province and hearing Dr. V. R. Bryner, Treasurer of the American Academy of General Practice address their dinner meeting. It was entirely manifest that this section was most anxious to strengthen their own position, but within the provincial and dominion associations and are most anxious not to do anything to detract from our unity and strength.

The report of the committee of economics, by Dr. A. Hollenberg of the Manitoba Division, was a most interesting one, as it focused attention on so many of the involved and vexatious problems facing the profession, including differences in opinion among ourselves—the trends towards the practice of medicine by the state or its agencies—the problem of Cancer Clinics—the problem of small hospitals with diagnostic set-ups—the clash between the Advisory Commission and the Minister of Health, with the Minister's disregard of the Commis-

sion's presence or its advice. Dr. Roy Richardson of this Executive, a member of this Commission, may have something to say on this matter when we consider the question of Health Grants. The Division passed a strong resolution requesting an early meeting of the Advisory Commission.

Dr. Morley Young, President of the Alberta College of Physicians and Surgeons, gave a very forceful warning to the profession in respect to abuses of the fee for service basis of practice—and the mounting costs for diagnostic work in consequence. The co-operation with the government in the matter of the Federal Health Grant Program was reported on as being extraordinarily good. One of the recommendations made by the Survey committee in Alberta was that, "The practising physician should be integrated into a plan providing cancer treatment, in order that the public receive the best service, particularly in the field of early recognition of the disease." Another recommendation of interest, under Hospital expansion, provides, "That under any prepaid hospital scheme, a small per diem rate for all patients be charged in order to deter the abuse of so-called free service." Medical Services Inc. of Alberta, within one year of its inception, has some 92 groups and a total enrollment of 15,500 persons and is reported as paying 80% of the assessed fees.

Discussion was opened in the British Columbia Division on, "Is the C.M.A. policy applicable in B.C.?"

First—in reference to item No. 7 of C.M.A. Policy referring to meeting the costs of hospitalization. The following was inserted in its place: "Having seen demonstrated the practical application of universal contributory Hospital insurance in the Province of British Columbia, we recommend that this is a practical first step in a Health Insurance Program, providing that adequate facilities are prepared before it is introduced."

The following resolution *was*, I am pleased to say, *referred back* to the Committee on Economics for reconsideration: "That the medical profession in British Columbia, having already seen some of the limitations of prepaid medical care plans on a voluntary basis, doubts whether sufficient of the population can be covered, and that if found necessary, a plan based on a universal (compulsory) contributory principle would be considered favourably."

The Saskatchewan Division passed a resolution at its 1948 annual meeting at which it went on record, "That we are in favour of state-aided, contributory, health insurance, on a reasonable fee-for-service basis, which shall include every resident of the province, provided that the administration of such an arrangement is put in the hands of a non-political independent commission on which the medical profession is adequately represented by its own

representatives elected by the College of Physicians and Surgeons." At the 1949 business session of the Saskatchewan Division, the meeting approved the policy of the C.M.A., with the recommendation that, "When and if the people of Canada, or the Province of Saskatchewan, want an all-inclusive prepaid health insurance plan, and the prerequisites of personnel and facilities have been met, that the principle of the 1948 resolution be stated as our opinion."

It is my duty to point out the urgent necessity of diligently pursuing the C.M.A. policy of June, 1949. There are many skeptics of items in this policy in our membership. We must make prepaid medicine more attractive and widely available. We must speedily cut through any obstructing interprovincial and intraprovincial barriers, in order to carry out the C.M.A. policy of voluntary prepaid medical care planning. As enthusiastic as we may be, however, in the promotion of that policy, we must be realistic, and we must be prepared with our answers, with our standards and our demands, in the event we are confronted with a definite plan from any province or from the Dominion for Government Health Insurance.

Have we, across Canada, sufficiently realized and taken cognizance that the Federal Health Grants have been advertised as the prerequisites to Government Health Insurance? Some of the Divisions are most happy in respect to the advice being sought and taken from the profession concerning the Federal Grants and Health Planning within the Province; other Divisions are only partly satisfied; other Divisions visited, such as Manitoba, are quite unhappy and feel that the profession are not given the opportunity to properly advise.

THE EIGHTY-FIRST ANNUAL MEETING

The time and place are now fixed for the next Annual Meeting. It will be held at Halifax, N.S., from June 19 to 23, 1950. Please make your reservations early.

The Housing Committee will take care of all requests for accommodation in the Halifax area. You should make your wishes known to Dr. C. M. Jones, Halifax Infirmary, Halifax, N.S. Dr. Jones will be happy to learn:

1. The type of accommodation desired.
2. If you would like a family cottage.
3. If you are a member of the Council.
4. If you are presenting a paper.
5. The date you plan to reach Halifax.
6. By plane, by train, or by car.
7. If you are planning to share your room with another member, and when he may be expected to arrive. We shall be glad to have any other information that will help us make you comfortable, and your visit enjoyable.

There is a wide price range in accommodation, and the housing committee will do all in its power to meet individual wishes.

Hotel accommodation of a first class nature will vary from \$2.75 to \$6.50 a day for single rooms, \$4.50 to \$10.00 a day for double rooms, European Plan. Tourist Homes are from \$1.50 a day upwards for rooms, while comfortable college residence rooms are slightly higher. If you would like a cottage for yourself and family within easy motoring distance of the city by bus or private car, write early, being sure to state the number in your party and the length of stay, and all efforts will be made to suit you.

The program will be presented to you in detail in a later issue. We can promise you it will be ample in amount and satisfying in character. This is the land of the general practitioner of medicine and a very special effort is being made to tune the program to his practical needs. The specialist will have his chance too, and sectional sessions will be held in a number of fields.

The ancient Province of Nova Scotia is proud of its reputation for hospitality. We pledge ourselves to do our best for you by way of entertainment. We wish you to leave with the inward feeling: "That was the best meeting I ever attended".

When the serious business of the meeting is over we hope you will linger awhile to enjoy

a stay in our beautiful Province. In this and in succeeding months we plan to show you pictures of this City of Halifax and of sites of beauty and interest throughout Nova Scotia. We shall be most happy to tell you of nooks off the highway rarely visited where you see nature at its best. As a Canadian you will delight to show your children where so many First Things in our way of life came into being, where so much of our history was initiated.

Finally do not forget that this old City marked an epoch in the history of our Association. Less than thirty years ago, weak, despondent, almost penniless, it met here by the Atlantic. Perfused by the spirit of the pioneers who came to these shores and built on brawn and faith, that meeting took stock of the situation and resolved to correct it. That determination has never faltered, never slackened. By our example we must show the oncoming members of the profession that achievement does not result from indolence or indifference, but from energetic united effort. We meet to improve our own lot and that of the Canadian People. Let no member remain indifferently at his own fireside.



The Public Gardens, Halifax

The Nova Scotia Government Bureau of Information, P.O. Box 130, Halifax, N.S., offers a selection of excellent booklets to intending visitors. "Canada's Ocean Playground", 62 pages, in colour, is a beautiful presentation; "Historic Nova Scotia", 114 pages, tells the history of the province; "Where to Stay in Nova Scotia", lists all hotels, inns, cabin colonies and overnight homes, with rates and opening dates; "Nova Scotia Tour Book", 123 pages, gives detailed accounts of towns and communities; "Nova Scotia Fish and Game" is a fine handbook for anglers and gunners; "Salt Water Angling" has full information about blue fin tuna, broadbill swordfish and the smaller salt water fish that offer visiting anglers the best fishing in America. The "Official Highway Map" shows all the roads of Nova Scotia, with mileages. These booklets and the map are sent free to any enquirer.

THE EXECUTIVE COMMITTEE

The Executive Committee of the Canadian Medical Association met in Toronto on Monday and Tuesday, November 28 and 29, 1949, with the following members present:

Dr. Harris McPhedran, Toronto (*Chairman*); Dr. J. F. C. Anderson, Saskatoon; Dr. Norman H. Gosse, Halifax; Dr. William Magner, Toronto; Dr. D. Sclater Lewis, Montreal; Dr. F. M. Bryant, Victoria; Dr. Harold Orr, Edmonton; Dr. E. A. McCusker, Regina; Dr. R. W. Richardson, Winnipeg; Dr. W. V. Johnston, Lucknow; Dr. J. E. Carson, Brantford; Dr. E. K. Lyon, Leamington; Dr. H. B. Church, Aylmer; Dr. E. S. Mills, Montreal; Dr. W. deM. Scriver, Montreal; Dr. D. A. Thompson, Bathurst; Dr. J. G. B. Lynch, Sydney; Dr. John Walsh, Manuels, Nfld.; Dr. T. C. Routley, General Secretary; Dr. A. D. Kelly, Assistant Secretary; Dr. H. E. MacDermot, Montreal, Editor.

Regrets regarding inability to be present were received from Dr. W. J. P. Macmillan of Charlottetown.

Among the items dealt with by the Committee were the following:

ANNUAL MEETING, 1950, HALIFAX

Dr. Norman Gosse, President-Elect of the Association, reported that arrangements for the eighty-first annual meeting to be held in Halifax during the week of June 19, 1950, are proceeding satisfactorily.

ANNUAL MEETING, 1951, MONTREAL

Tentative arrangements have been completed for the eighty-second annual meeting to be held in Montreal during the week of June 17, 1951, with headquarters in the Mount Royal Hotel.

ANNUAL MEETING, 1955

The British Medical Association has accepted an invitation to meet with the C.M.A. in Canada in 1955. On three occasions, the British Medical Association has met in Canada, namely, 1897 in Montreal, 1906 in Toronto and 1930 in Winnipeg.

DIVISIONAL ANNUAL MEETINGS

The President, Dr. Jack F. C. Anderson of Saskatoon, reported upon his tour of Canada during the autumn when he had the privilege of attending Divisional Annual Meetings in seven of the ten provinces. The President reported that all meetings were highly satisfactory.

COMMITTEE ON ECONOMICS

An interim report was received from the nucleus committee on Economics, relating to Prepaid Medical Care Plans and allied subjects. The Committee spent considerable time discussing various ways and means of assisting the Plans in spreading their activities across Canada in harmony with the resolution from General Council to be found in our Statement of Policy.

FEDERAL HEALTH GRANTS

The Committee received progress reports from the ten provinces relative to the Federal Health Grants and the Health Surveys which are being carried out. In most of the provinces the medical profession has been invited into active co-operation with the Governmental authorities in the medical surveys.

REHABILITATION OF THE HANDICAPPED

The Committee accepted an invitation from the Honourable Minister of Labour to a national conference to be held in Ottawa to discuss problems associated with the rehabilitation of the handicapped. Dr. Hoyle Campbell of Toronto was named as the C.M.A. representative.

WORLD MEDICAL ASSOCIATION

Dr. William Magner of Toronto, our immediate Past President, presented an excellent report of the third annual meeting of the World Medical Association held in London in October. Dr. Magner and the General Secretary were delegates representing the Canadian Medical Association at this meeting. The fourth annual meeting of the World Medical Association will be held in New York in October, 1950.

NATIONAL HEALTH SERVICE ACT OF GREAT BRITAIN

Dr. Magner presented an interesting and illuminating report of the actual workings of the National Health Service Act of Great Britain, based upon a tour which he made in and around London where he met a considerable number of medical personnel who were operating under the Act. This report appears in this issue of the *Journal*.

ARTHRITIS

Dr. E. S. Mills of Montreal, Chairman of the special Committee on Arthritis, reported that, under the auspices of his Committee, Dr. Lester MacCallum of Montreal will shortly commence a trans-continental tour of Canada, visiting all the Divisions and carry out an inquiry on existing facilities for the treatment of arthritis in civilian hospitals.

MEMBERSHIP

The following report on Membership (as at November 21, 1949) was presented:

Division	Paid, 1948	Paid, 1949	Gain or loss on 1948
British Columbia	888	954	+ 66
Alberta	733	779	+ 46
Saskatchewan ..	619	614	- 5
Manitoba	654	658	+ 4
Ontario	3,922	3,962	+ 40
Quebec	1,237	1,121	- 116
New Brunswick .	337	360	+ 23
Nova Scotia ...	430	440	+ 10
Prince Edward Island	64	57	- 7
	8,884	8,945	Total gain 61

PUBLIC RELATIONS

On the recommendation of the Committee on Public Relations it was agreed that this program should be greatly accelerated during the coming year and the necessary personnel engaged to carry it on. Under the direction of the committee, a film strip has been

completed entitled, "Careers in Canadian Medicine", along with a carefully prepared manual, to be distributed to more than 250 high schools in Canada with the compliments of the Canadian Medical Association.

DISPLACED PHYSICIANS

The Committee learned with much interest of the meticulous care with which the various medical licensing bodies in Canada are examining and reviewing applications from displaced physicians who have found their way to Canada. From the reports received it was evident that a kindly and sympathetic attitude was manifested by the various committees in the difficult task of assessing foreign diplomas.

DEFENCE MEDICAL AND DENTAL ADVISORY BOARD

The Association has been invited by the Department of National Defence to appoint three representatives to the Defence Medical and Dental Advisory Board, a body very similar in function to the previous Canadian Medical Procurement and Assignment Board. The following were appointed as the Canadian Medical Association representatives: Dr. J. A. MacFarlane, Toronto; Dr. Mathieu Samson, Quebec; Dr. T. C. Routley.

CONCLUSION

The foregoing, together with a number of other items constituted two very heavy days' work for the Committee.

T.C.R.

MEDICAL SOCIETIES

La société médicale des hôpitaux universitaires de Québec

Société médicale des hôpitaux universitaires de Québec
vendredi, le 16 septembre, 1949.

Traitement chirurgical par voie endo-thoracique (sept observations).—François Roy.

L'auteur rapporte sept cas de cancer du cardia qui ont pu être opérés avec succès par voie endo-thoracique. L'âge de ces malades varie entre 56 et 70 ans et la durée d'évolution clinique de la maladie entre 2 et 10 mois. Trois sont décédés. La survie a été de 13 mois et de 3 ans. Deux ne présentent aucun signe clinique de récurrence ou de métastase après deux ans. Un est mourant de métastases abdominales après vingt mois. Le dernier vient d'être opéré.

Il est important de noter qu'on a pu enlever les tumeurs des sept malades qui se sont soumis à l'opération et, sur ce nombre, un seul avait des métastases ganglionnaires discrètes. D'après ces quelques cas, il semble que le cancer du cardia ne soit pas un trop mauvais cancer. D'ailleurs les statistiques démontrent que 23% des malades vus à l'autopsie présentaient des néoplasmes réséquables.

La précocité du diagnostic est la chance essentielle qui doit être donnée au malade. La dysphagie vraie est déjà un symptôme tardif. La moindre gêne rétro-sternale, au moment de l'alimentation, le moindre trouble digestif surtout chez un sujet ayant dépassé la cinquantaine, commandent un examen sérieux de l'œsophage et de l'estomac. Une fois que le diagnostic du cancer du cardia ou de l'œsophage a été porté, la chirurgie s'impose. Ces quelques cas rapportés, tous avec des suites opératoires faciles, montrent la confiance que médecins et malades doivent lui accorder, à condition que les uns et les autres aient le courage de l'accepter avant qu'il ne soit trop tard.

Anesthésie en pédiatrie.—Fernando Hudon et A. Jacques.

Après quelques considérations anatomiques et physiologiques spéciales à l'enfant, les auteurs étudient les soins et la médication pré-opératoire, soulignent les avantages et les désavantages des anesthésiques habituels, préconisent l'intubation, passent en revue l'adaptation des différentes méthodes et les techniques anesthésiques variées pour le jeune malade, expliquent le protocole de la dissection veineuse et résument les soins post-opératoires.

Société médicale des hôpitaux universitaires de Québec
vendredi, le 30 septembre, 1949.

L'alcoolisme chronique et ses traitements.—Lionel H. Lemieux.

L'alcoolisme chronique est devenu un problème médical depuis le milieu du XIX^e siècle. On a préconisé des cures d'abstinence et d'isolement, des cures morales, psychologiques et psychiatriques, des cures médicamenteuses et biologiques et enfin diverses cures de dégoût dont la plus récente est la cure par l'ANTABUSE. On rapporte de nombreux incidents survenus au cours du traitement par l'ANTABUSE de 32 alcooliques chroniques: principalement, quatre cas de réactions allergiques cutanées, deux cas de pollakiurie durable, dont un avec énurésie et impuissance sexuelle, un cas d'épilepsie généralisée et deux cas d'excitation maniaque. Les résultats thérapeutiques rapportés par d'autres auteurs tendent à se rapprocher de ceux de toutes les autres cures, soit 40% de guérisons et 60% d'échecs. Cette proportion semble s'expliquer par l'existence d'une constitution psychopatique chez 60% des alcoolomanes.

Traitement du vertige de Ménière (Emploi des anti-histaminiques).—Charles-A. Martin et A. Beaudry.

Le vertige labyrinthique a des caractères bien définis et objectifs. C'est un syndrome de localisation qui peut être symptomatique ou cryptogénétique. On en reconnaît des formes passagères et des formes paroxystiques de longue durée. Ce sont ces dernières formes, surtout quand elles sont cryptogénétiques qui présentent un problème médical étiopathogénique et thérapeutique. Chaque théorie explicative est à l'origine de thérapeutiques spéciales. Les principales sont: celle des accidents vasculaires, celle des infections focales, celles des troubles métaboliques, vasomoteurs et allergiques. On présente l'observation de deux malades qui ont été guéris par le Phenergan et on rapporte les succès obtenus par la Dramamine (Gravol). L'action de ces médicaments n'est pas rapportée à leur propriété anti-histaminique. Le méniérisme psychosomatique est considéré comme une erreur de diagnostic.

CANADIAN ARMED FORCES

News of the Medical Services

Surgeon Commanders H. R. Ruttan and M. Wellman, R.C.N., along with Surgeon Lieutenant Commander R. W. MacNeil, R.C.N.(R), of Winnipeg, and Surgeon Lieutenant J. L. Bean, R.C.N.(R), Toronto, recently attended a five-day course in "Medical Aspects of Special Weapons and Radioactive Isotopes" held at the United States National Naval Medical Centre, Bethesda, Md.

Surgeon Commander E. H. Lee, Principal Medical Officer, H.M.C.S. *Magnificent*, prominently figured in the rescue by H.M.C.S. *Haida* on November 17, 1949, of 18 survivors of a United States B29 forced down in the Atlantic. Commander Lee was transferred at great risk, in a small boat through heavy seas, to the *Haida* where he rendered medical aid to the survivors.

Dr. H. D. Oliver, a graduate of London University (Eng.) 1948 and Dr. D. G. Wood, University College, Galway, 1948, were recently commissioned as Surgeon Lieutenants, R.C.N., and appointed for duty in the R.C.N. Hospitals, Halifax, N.S. and Esquimalt, B.C., respectively.

Major N. D. C. McKinnon, Command Hygiene Officer, Western Command, has been appointed Honorary Consultant in Preventive Medicine to the Calgary and Vancouver Districts of the Department of Veterans' Affairs, and Major R. A. Smillie, Command Hygiene Officer, Prairie Command, has received a similar appointment to the D.V.A., Winnipeg District.

The following medical officers were recently appointed to commission in the Canadian Army (Active Force): Capt. G. L. Stoker, 11 Detachment, R.C.A.M.C., Vancouver; Capt. M. Chelsky, Toronto Military Hospital. Capt. Stoker graduated from Manitoba University in 1935 and served as an R.C.A.M.C. officer throughout the late war. Captain Chelsky graduated from Toronto University in 1949.

The annual conference of the Command and Area Medical Officers of the Canadian Army was held at Army Headquarters, Ottawa, December 15 and 16, under the Chairmanship of the D.G.M.S., Brigadier W. L. Coke, O.B.E., R.C.A.M.C.

Considerable interest has been shown in the National Defence policy of subsidizing veteran university students in their final year at university. This policy was first instituted for the university year 1948-49 and later extended to cover the 1949-50 term. Veteran students under this plan receive a commission in the Armed Forces and draw pay and allowances of their rank. University fees are paid by the Department and requisite textbooks and instruments are supplied. Thirty-two final year medical students are presently training under this plan, 9 having received commissions in the R.C.N., 17 in the R.C.A.M.C., and 6 in the R.C.A.F. Of this group 18 are attending the University of Toronto, 11 the University of Western Ontario, 2 McGill University and 1 Dalhousie University.

Under the same plan, 5 final year pharmacy students have been commissioned in the R.C.A.M.C. Similarly, 22 dental students have received commissions in the R.C.D.C.

SPECIAL CORRESPONDENCE

The London Letter

(From our own correspondent)

SIR WILSON JAMESON

The announcement of the forthcoming retirement of Sir Wilson Jameson from the post of Chief Medical Officer of the Ministry of Health and of the Ministry of Education marks the ending of the active professional career of one of the greatest figures in the public health service of the country. Sir Wilson had the inestimable advantage of coming to his present appointment from a life spent outside Government service. A graduate of the university of Aberdeen, he had already had practical experience as a medical officer of health before being appointed Professor of Public Health in the University of London. As dean and director of the division of public health at the London School of Hygiene and Tropical Medicine he showed his gifts for administration and the handling of men, and it was from this post that, in November, 1940, he was appointed to his present key position in the Ministry of Health. His task was not an enviable one, but as medical officer responsible for the health of the nation during those try-

ing years of war he rose nobly to the occasion. The record of the nation's health during these years is a striking tribute to the skill with which he directed and co-ordinated the civilian medical services.

When the war was over an almost equally formidable task awaited him as chief medical adviser to the Minister of Health during the tempestuous negotiations with the medical profession over the introduction of the National Health Service Act. It is a striking tribute to the skill with which he performed this task that no word of criticism ever attached to him no matter how bitterly the Minister might be assailed. As *The Times* aptly expresses it, his "shrewd counsel and persuasive Highland voice always struck the note of responsible and skilled public service".

ROYAL COLLEGE OF OBSTETRICIANS

The appeal of the youngest Royal College for £400,000 has received an auspicious opening by a gift of £1,000 from the Queen who has just been admitted to honorary fellowship of the College "for all she has done for the benefit of British womanhood, for the great example she has given us of domestic happiness, and for her constant support of the college". The main purpose of the appeal is to provide funds for a new building for the college which has outgrown its present home in Queen Anne Street. It is proposed to allocate £200,000 for this purpose, whilst £150,000 is for research and general funds, and £50,000 for a travelling professorship. The college has made remarkable progress since it was incorporated twenty years ago, and one of its unique features is that it is a commonwealth college governed by a council in this country, with regional councils in Canada, Australia and New Zealand. To appeal for such a large sum at the present moment is an act of faith in keeping with the youthfulness of the college, but if the old adage is still true that "by their fruits shall ye know them", then there is every reason to believe that the appeal will not be in vain.

REMUNERATION OF GENERAL PRACTITIONERS

"The Minister cannot, therefore, entertain any claim by the Association for larger total remuneration. Moreover, quite apart from this clear conclusion, to which the analysis of the facts must lead him, the Minister would point out that the Association's proposals have to be seen also against the background of the general economic situation and the vital national need to avoid any unjustified raising of remuneration in any field. Under such conditions it becomes even more apparent that it would not be possible for him to justify any increase for general medical practitioners at the present time". (Extract from a letter from the permanent secretary to the Ministry of Health to the secretary of the British Medical Association, November 14, 1949.)

"His present attitude can but alienate practitioners still further. Many of them were persuaded to enter the service on the understanding that the suggested pool of money provided was but an interim payment made to allow proper discussion of terms with their representatives in the light of the Spens promises, with full weight given to changing money values. They believed they had found in the Spens proposals a new and agreed approach to equitable terms. Instead they are now met with the Minister's blunt refusal to depart from the basis for their remuneration which he himself originally laid down without consultation". Editorial, *The Lancet*, November 26, 1949.

Little comment is called for in amplification of these two extracts, except to point out that throughout the whole of the controversy surrounding the introduction and initiation of the national health service, the policy of *The Lancet* has been to try and bring the two sides together. It is a somewhat pessimistic note on which to end the old year, but no more pessimistic than is the outlook for the general practitioner who sees nothing ahead of him in 1950 but increasing hardship for himself and his wife as he tries to ensure that, whatever else may suffer as a result of his rapidly diminishing

income, it will not be the education of his youngsters for which he has planned so long and which was dependent upon his continuing to earn the income which he had in the pre-1948 days.
London, December, 1949. WILLIAM A. R. THOMSON

OBITUARIES

At the time of going to press we learn with the deepest regret of the death of Dr. Fulton Gillespie, of Edmonton. An extended notice will appear later.

Mrs. Alexander Bruce, M.D., formerly Dr. Catherine Bradshaw, died in Montreal on November 24. Born in Manchester, England, in 1872, Mrs. Bruce came to Toronto in 1877 with her family. She attended high school there and was one of the first women medical students in Canada. She graduated with honours from University of Toronto. Her appointment on the staff of the Philadelphia Women's Hospital made her one of the first two Canadian women ever to be given an appointment in an American hospital. She took post-graduate courses in Baltimore and later returned to Toronto to practise. She retired from medical practice when she married in 1904 and had resided in Montreal since that time. She was an active member of St. Andrew's Church in Westmount, Montreal Women's University Club, Women's Canadian Club, and the Women's Art Society of Montreal. She is survived by a son and two daughters.

Dr. Donald W. Buchanan died at his home in Bath, N.B., on November 12. Dr. Buchanan was born at Neil's Harbour, Cape Breton in 1900. He was a graduate of Mount Allison Academy and received his medical education at Queen's University, where he graduated in 1927. In the First Great War he served with the artillery and was a member of the Murmansk Contingent. He was senior resident at the Saint John General Hospital. Here and elsewhere he made many friends. He had practised at Cambridge, Minto, and at the time of his death he was on the staff of the Bath Private Hospital. In spite of recurring illness Dr. Buchanan maintained a keen interest in affairs and will be remembered for the firmness of his friendships. He is survived by his wife, three sisters and three brothers.

Dr. Walter H. Cameron, aged 70, physician to the Mond Nickel Co. at Copper Cliff and Coniston, died November 20 at St. Petersburg, Fla. Born in Arthur, and an honour graduate of the University of Toronto Medical College in 1905, he had practised for several years in Thessalon. In Toronto he was a member of the Rosedale Presbyterian Church. He is survived by three sons and two brothers.

Dr. William Alexander Chisholm died suddenly on November 3 in Mount Dora, Florida. He was born at Salt Springs, Antigonish County, in 1866. He studied at Pictou Academy, was graduated in arts from St. Francis Xavier University, and taught school in different parts of Antigonish and Guysboro counties before studying medicine. After attending the Medical School of Dalhousie University he entered Bellevue Hospital Medical College, New York, and graduated with honours. He practised his profession in that city for over 30 years with distinction until his retirement. Surviving besides his widow are two sisters.

Dr Ernest Cliche est décédé à l'âge de 71 ans et 11 mois, à East-Broughton, Que., le 11 novembre. Il obtint son doctorat en médecine de l'Université Laval en 1902. Le Dr Cliche fut le premier médecin de sa place natale. Il y exerça sa profession jusqu'à ces tout derniers temps. Il laisse son épouse, 4 fils, 2 filles et 2 frères.

Dr. Allan S. Eagles, aged 69, medical practitioner in Meaford for 32 years and former medical officer of health for St. Vincent Township, died on November 23. He graduated in medicine from the University of Toronto in 1911. Surviving are his widow, two daughters, one son, five brothers and two sisters.

Dr. Emerson S. Hill, aged 51, died in Torrington, Conn. on October 26. A native of Maxville, Ont., he took his degree in medicine at McGill University.

Dr. Perry O. King, of St. Thomas, Ont., died unexpectedly on November 11, of a heart attack. He was 64. Born in St. Thomas he graduated in medicine from the University of Western Ontario in 1911. He was one of the veteran members of the St. Thomas Golf and Country Club; a life member of St. Thomas Lodge No. 44, A.F. & A.M.; and an active member for years of the St. Thomas and Elgin Medical Association. He was a member of Trinity Anglican Church. Surviving are his widow, a daughter, a son and a brother.

Le docteur Victor Philippe Landry est décédé à Montréal le 30 octobre dernier après une longue maladie. Il était âgé de 72 ans. Né à Valmont, le 20 juin 1877, il avait fait ses études au séminaire des Trois-Rivières et à l'université Laval de Québec où il fut diplômé de la Faculté de médecine en 1904. Il pratiqua sa profession à Bécancour de 1904 à 1913, où il se spécialisa dans la médecine générale. Outre son épouse, lui survivent quatre filles, huit fils, quatre sœurs et un frère.

Dr Arthur Lapointe est décédé à l'âge de 83 ans et 6 mois. Né à La Malbaie, le 15 août 1866, il fit ses études au séminaire de Chicoutimi. Il obtenait son doctorat en médecine de l'université Laval en 1892. La même année, il alla s'établir à La Malbaie où il exerça sa profession durant 57 ans. Pendant le cours de sa longue carrière, le Dr Lapointe a eu le rare mérite d'être appelé pour au moins 10,000 naissances. C'était un gynécologue dont la réputation s'étendait bien au delà de La Malbaie. En dépit de la lourde tâche que lui imposait sa profession, il accepta d'être maire de La Malbaie, poste qu'il occupa très brillamment pendant 20 ans. On peut dire qu'il fut un des principaux promoteurs de toutes les améliorations importantes qui se firent dans la région depuis un demi-siècle. Il a largement contribué à la construction du chemin de fer, de l'aqueduc, du service électrique, du téléphone et en ces dernières années, de l'hôpital. Il laisse son épouse, deux fils et quatre filles.

Dr Ernest Lapointe est décédé récemment à l'hôpital Notre-Dame de l'Espérance de Ville St-Laurent, à l'âge de 56 ans. Il avait fait ses études au séminaire de Ste-Thérèse et à l'université de Montréal. Outre son épouse il laisse deux frères et une sœur.

Dr. John A. McAsh, aged 85, died on November 13. Born in Bayfield Rd., near Verna, he graduated from University of Toronto. He had practised in Belgrave, Sarnia and for 40 years in Tara. He was an elder in Knox Presbyterian Church and had also served on the Tara School Board. He was a member of the Royal Arch Masons and the I.O.O.F. Surviving are a son, a daughter, a brother and a sister.

Dr. Wesley N. McCormick, aged 64, died suddenly on November 1 in Listowel Memorial Hospital, shortly after he had suffered a heart attack. He was born in Elma township. After graduating from Listowel High School, he taught for several years, later going to University of Western Ontario, London, where he graduated in 1913. From 1914 to 1918 he served overseas with the Medical Corps. On his return to Canada he started practice in Toronto in 1919, and was there until he retired in 1945, and came to Listowel. He was a member of Listowel United Church, of Listowel Lodge No. 160 I.O.O.F., and Listowel Branch No. 259 Canadian Legion. Besides his sister he is survived by a brother.

Dr. Purdy Alvin Macdonald died at Halifax, on October 26, 1949. A native of New Brunswick, he graduated from McGill University in Medicine in 1906. Soon after graduation he began practice in Halifax. While he always considered himself a general practitioner he gave special attention to surgery and obstetrics. A member of the Faculty of Medicine of Dalhousie University for many years he was a capable and inspiring instructor, giving clinics at the Children's Hospital and at the Grace Maternity Hospital. He was Medical Superintendent of the latter institution until his last illness. He was a Fellow of the American College of Surgeons. He is survived by his widow, one brother and one sister.

Dr. Robert Hugh MacLeod, of Halifax, died on December 3, in his 65th year. He was born at Middle River, Pictou County, and secured his early education at Pictou Academy. For several years he engaged in teaching, first at Westville, then at Pictou Academy, and later as Principal of Lunenburg Academy. In 1920 he entered the Dalhousie Medical School and on graduation in 1925, practised at Musquodoboit, Nova Scotia. In 1929 he joined the United States Public Health Service until ill health forced his retirement. Following recovery he proceeded to England where he remained doing postgraduate study and practice until 1939 when he returned to Canada. Since that time he practised at Upper Stewiacke and latterly in Halifax. His widow and a son survive.

Dr. J. Edward Millaire died suddenly at Godbout, Que., on November 16. He was in his 68th year. Surviving besides his widow are a daughter, a son, two brothers and three sisters.

Dr. Daniel James Sweeney, aged 72, died on November 11, in Vancouver, after a lengthy illness. He had practised in Vancouver from 1923 to his retirement three years ago. Born in Caledon, Ontario, he graduated from the University of Toronto. He served with the Royal Canadian Army Medical Corps during the First World War. He is survived by his widow, one son, two daughters, one brother and one sister.

Dr. John Lawrence Welch of Govan, Sask., died in the Grey Nuns Hospital after a brief illness on October 11. He was 54 years of age. He was born in Brockton, Massachusetts, U.S.A. in 1895 and attended Boston College. He received his M.D. degree from Middlesex College of Medicine and Surgery, Cambridge, Mass. in 1920. He served in the American Army in the First Great War and on his return from overseas he accepted a position on the staff of the Regina General Hospital. He began to practise in Govan February 25, 1922. He is survived by his widow, two daughters, two sons, one brother and five sisters.

NEWS ITEMS

Alberta

We in Alberta regret to announce the passing of two of our members of the profession Dr. Egerton L. Pope and Dr. Fulton Gillespie. Because of their recent deaths further notification will be given in a later issue of the *Journal*.

The following are to be congratulated in passing their examinations in the Royal College of Physicians and Surgeons of Canada; Dr. A. W. Hardy in general surgery; Dr. J. P. Morreau in orthopaedic surgery; Dr. H. Whiting in internal medicine all of Edmonton. Dr. Smith Gardner in general surgery, Dr. Gardner received his F.A.C.S. also and is practising his art in Calgary. Dr. Morley Tuttle of Lethbridge in internal medicine.

A number of the medical men are taking advantage of the beautiful weather in Alberta at this time and may be seen on the fairways having their last swing at the little white ball (December 5, 1949).

The following men received their Certification from the Royal College of Physicians and Surgeons; Dr. R. E. Jespersen and Dr. A. J. Lobsinger in general surgery; Dr. T. A. Gander in paediatrics. We wish to congratulate these men for their attainments.

Dr. J. E. Musgrove, formerly of Winnipeg has taken up practice in general surgery. Dr. Musgrove is a Fellow of the Royal College of Surgeons and served with the R.C.A.M.C. in the last world war. Dr. Musgrove is practising in Edmonton.

Dr. T. S. Wilson, formerly of Toronto has taken up practice in general surgery in Edmonton. Dr. Wilson is a Fellow of the Royal College.

The new Pathological Building, just west of the University hospital is nearing completion and will be a great added factor to the rapidly growing University of Alberta.
W. CARLETON WHITESIDE

British Columbia

The Provincial Government, some time ago, engaged the services of James A. Hamilton and Associates, to study the hospital situation in the province. These gentlemen have now brought in their report—a very full one. They suggest, amongst other things, the following. The provision of 2,800 new active treatment beds by 1951, and 2,000 chronic case beds—the cost to be roughly sixteen million dollars. B.C. to be divided into six "hospital areas"—with a completely integrated hospital system in each. Establishment of a training school for hospital administrators—of a Dental College at the University of British Columbia in conjunction with the medical faculty—encouragement of high school graduates to take up nursing—reduction in the number of hospitals now operating in British Columbia—and increases in community clinics and health centres.

The Crease Clinic of Psychological Medicine has been named in honour of Dr. A. L. Crease, the nationally known Director of the Provincial Mental Hospital at Essondale, B.C. He has filled this office for the past 24 years, and has brought it to a point where it equals in efficiency and up-to-dateness any institution of its size on the Continent. Dr. Crease retires this year from his position as Director, and this building is a tribute to his long service.

It is designed specially for prophylaxis of mental disease and early treatment under hospital conditions. It is furnished completely, with operating facilities, research laboratories, and so on. It is also specially designed to give privacy and every possible comfort to the individual patients. It is felt that much can be done here to arrest the progress of mental mishaps into confirmed mental disease.

The recent death of Dr. Hill H. Cheney will bring a sense of regret and personal loss to all who knew him here, and to many who knew him in Montreal, from which city he came to Vancouver. Dr. Cheney was on the radiological staff of the Vancouver General Hospital for many years, until he left to take up a position with the Provincial Government in radiology. Dr. Cheney was greatly interested in all activities connected with art. Many of these owed much to his work and enthusiasm, and he will be greatly missed in this regard. He had a friendly and genial nature, and he was immensely popular with a very wide circle of friends.

The annual Medical Dinner of the Vancouver Medical Association was held on November 23, and was an immense success. All the entertainment was provided by

medical men, and it was worthy in every way of the best traditions of this institution, which fills an important place in the year's program of the Association.

At the Annual Meeting of the B.C. Hospital Association held during the month, and attended by some 250 delegates, the Hon. George Pearson, Minister of Health for B.C. told the delegates that "they must reduce hospital costs". These have risen in four years from \$9,000,000 to \$17,000,000. This is not as bad as it may sound—since a similar rise has taken place in every phase of life in the country. Food costs have doubled, and more, since the war ended; wages have risen, hours of labour have been shortened, and more and more is being demanded of the hospitals in services. However, the B.C. Government is showing its good faith by instituting enquiries into the costs of all government departments—and now, under government control, hospitals must perforce come under the scrutiny of the exploring commissions and government committees.

J. H. MACDERMOT

Manitoba

Dr. J. P. Gemmell, Assistant Professor of Medicine, University of Manitoba, addressed the Scientific Club of Winnipeg, November 8, on the subject: "Adrenal Cortical Hormones in Health and Disease". He spoke of clinical research work now being done in testing the value of cortisone and ACTH in the treatment of rheumatoid arthritis, acute rheumatic fever in children, hypertensive and allergic states and lymphoid sarcoma.

ROSS MITCHELL

New Brunswick

Dr. Sheila Murphy of the staff of the Saint John Tuberculosis Hospital, is taking a year's postgraduate course in anaesthesia at Boston.

Dr. H. B. Atlee of Dalhousie University was the special speaker at the November meeting of the Saint John Medical Society. His topic "Chronic Right Sided Pain in Women". Description of an address by Dr. Atlee is difficult but it is safe to say that he destroyed certain current fictions as to the cause of such pain. He also stressed facts which sometimes are overlooked and presented a strong case for the caecum as the focal point in explaining right sided pain, the caecum being disturbed by constipation. The very large audience provided good discussion and it is certain that a good time was had by all. Dr. Cannell, a visiting physician from Great Britain, gave some of his own reactions to the present Health Service in that country.

Dr. A. L. Donovan has been appointed chief of medical services on the indoor staff of the Saint John General Hospital, vice, Dr. W. O. McDonald, who resigned. Dr. McDonald will continue as chief of the diabetic service.

Dr. R. G. Giberson, of Bath, leaves shortly to begin a three-year residency in surgery at the Mayo Clinic.

Dr. Jos. Tanzman, was certified in gynaecology on examination.

Dr. V. A. Snow of Hampton, has been appointed to the Medical Council of New Brunswick, by the Provincial Government, to succeed Dr. W. W. White, who had been a member of council for many years.

Dr. J. A. Melanson, chief medical officer for New Brunswick, has been elected a Fellow of the American Public Health Association at their annual meeting in July, 1949. Dr. Melanson has just returned home after attending the meeting of the executive of the Dominion Council of Health.

Dr. Gordon C. Gaulton successfully passed the examination for the certificate in oto-laryngology at the recent board examination.

Dr. E. O. Thomas, of St. Stephen, is again confined to bed following a second attack of coronary disease.

At the fall meeting of the Medical Council of New Brunswick, Dr. P. C. Laporte, M.B.E., of Edmundston, was elected president for 1950 and Dr. J. M. Barry of Saint John, was re-elected Registrar.

Dr. George A. Lyons, and Dr. H. Paul Melanson, of Moncton, have been granted bursaries by the N.B. Division of the Canadian Cancer Society for study of treatment and diagnosis of cancer at a New York clinic.

The clinicians of the Cancer Diagnostic Clinics, of the N.B. Department of Health met in Saint John, November 22, at the General Hospital. Dr. J. R. Nugent was chairman of all meetings. The work of the past year was surveyed and methods of reporting discussed. Additional equipment was recommended and policy of the Health Department was further explained by Dr. Austin Clarke of Fredericton. Present were: Drs. Everett Chalmers, J. P. McInerney, H. S. Everett, J. W. Dobson, P. C. Laporte, J. C. Duffy, R. H. Morrissey, T. E. Nugent, John A. Finley, R. A. H. MacKeen, A. S. Kirkland, and F. B. Wishart.

Dr. D. A. Thompson, of Bathurst, received the Fellowship of the Royal College of Physicians and Surgeons on examination at the recent annual meeting of the College.

A. S. KIRKLAND

Newfoundland

Recent appointments in the Department of Health include, Dr. L. Miller as Deputy Minister of Health, Dr. J. McGrath as Assistant Deputy Minister and Dr. P. O'D. Gallagher as Chief Medical Officer. Prior to Confederation, Dr. Miller was Director and Dr. McGrath Assistant Director of Medical Services.

The medical profession tendered heartiest congratulation and felicitations to their esteemed Doyen, Dr. Herbert Rendell, I.S.O., who on November 9, celebrated his 91st birthday. Newfoundland's oldest physician was honoured by His Majesty The King for his crusade against tuberculosis. The passing years have not dimmed his personal magnetism and charm as he was seen chatting amiably this summer with the Governor General and the Viscountess during the visit of their Excellencies to the Newfoundland Government Sanatorium, where Dr. Rendell served as first medical superintendent for some years prior to his retirement from active practice in 1934.

At a recent public meeting in St. Anthony, Dr. Charles S. Curtis was invested with the Most Excellent Order of Commander of the British Empire, conferred upon him by His Majesty The King, in recognition of his many years of outstanding service as Superintendent of the Grenfell Memorial Hospital at St. Anthony. He was also presented with an address of appreciation by the people of the community testifying to the valuable work which he had carried out during the many years given to their welfare.

The St. John's Clinical Society has resumed monthly meetings after the summer recess. On Thursday evening November 3, three interesting and informative papers were presented. Dr. R. J. Simms reviewed the literature on Compound E. Dr. W. J. Higgins spoke briefly on Radiological Pelvimetry and Dr. H. D. Rosenberg spoke on the treatment of Hemorrhoids.

Major J. R. Fiendel, R.C.A.M.C. is being welcomed to Newfoundland where he is serving as Area Medical Officer.

J. B. SQUIRE

they scrap about most things



but on one thing they agree—

This liquid penicillin tastes good!

Your young patients will take ESKACILLIN willingly because it is so deliciously flavored, so easy to swallow. Furthermore, parents much prefer ESKACILLIN to the chore of crushing penicillin tablets and coaxing a sick child to swallow an unappealing mixture.

One teaspoonful (5 cc.) of ESKACILLIN contains 50,000 units of crystalline penicillin G—and produces a blood level equivalent to that obtained with a 50,000 unit penicillin tablet. ESKACILLIN is supplied in 2 fl. oz. bottles, providing 600,000 units of penicillin.

Eskacillin *the unusually palatable*
liquid penicillin for oral use

Smith Kline & French Inter-American Corp., Montreal 1

Nova Scotia

The Annual Meeting of the Provincial Medical Board was held at Halifax on December 2, 1949. Dr. J. G. MacDougall, of Halifax, was re-elected President.

Plans are in progress to continue the *Dr. John Stewart Memorial Lecture* initiated by the Provincial Medical Board at the annual Dalhousie University Refresher Course this year. Sir James Learmonth, Regius Professor of Clinical Surgery at Edinburgh University delivered the first lecture.

A recent communication from Dr. John Cameron of Bournemouth, England, one time Professor of Anatomy at Dalhousie University, indicates his intention of going to Sicily early in the new year to improve his knowledge of Italian. He remarks, "I was diving in a submarine in the First World War, I went around the world in 1937 by sea, and I am now taking to the air in my old age".

Many friends of Dr. J. B. Reid of Truro are delighted to see him in active circulation again after a long period of ill health.

Dr. J. F. Bates of Sydney has been appointed to the Person's Branch of the Department of Veterans' Affairs, Ottawa.

Dr. Roy Chisholm, formerly of Kentville is at present on the staff of the City Tuberculosis Hospital, Halifax.

Dr. Audley Giffin of Kentville who has been seriously ill for several months is now making satisfactory progress towards recovery. H. L. SCAMMELL

Ontario

A hospital for the treatment of alcoholics is being established in Erindale by the Department of Health of Ontario and will be in operation within a short time. The Ontario Government has purchased an 18-room house and will transform it into a 30-bed hospital. The building is already furnished and there will be no difficulty in obtaining other needed equipment. Purchase of the hospital results from the approval given by the Ontario Legislature in its 1949 session to the formation of a body to conduct a program of research in alcoholism and to operate a hospital for experimentation in methods of treating alcoholics. Health Minister Kelley announces a board is being set up to operate the hospital. A government grant to the Alcoholism Research Foundation, which in turn will pass it on to the hospital board, will cover the full cost of the hospital and equipment.

On November 23, a centre for experimental Surgery was officially opened at 73 Homewood Ave., Toronto, by Lord Webb Johnson, consulting Surgeon to Queen Mary and past president of the Royal College of Surgeons. It will be known as the W. P. Caven Memorial Research Foundation. The funds were bequeathed by his widow in memory of Dr. William Proudfoot Caven. The staff at present consist of Dr. Gordon Murray, Dr. Richard Holden and Miss S. deWolfe. The centre will devote most of its efforts to research in vascular surgery and artificial kidney.

Dr. J. G. Leonard has moved his practice from Kingsville, Ont. to Amherstburg.

Under the Coroners Act, the following are appointed Coroners for the city or county as specified: Dr. E. S. Hicks, Brantford; Dr. R. L. Hutton, Brantford; Dr. William Gordon West, Chippawa, County of Welland; Dr. Richard Hamilton Doyle, Brigden, County of Lambton; Dr. Clarence A. Henrich, Courtright, County of Lambton; Dr. James Frederick Roberts, Sarnia,

County of Lambton; Dr. John Edward Roddick, Brantford, County of Brant.

Dr. H. L. Bower has opened a practice at Atwood, Ontario.

Dr. J. B. MacKay has accepted an appointment as pathologist for the Ontario Government. Dr. MacKay had been for several years in charge of laboratories at the Belleville General Hospital.

On November 26, the heads of nine medical care plans met in Toronto to discuss reciprocal agreements and the possibility of a nation wide medical plan. Dr. Hugh Logan, president of the Physicians' Services Inc. stated that the P.S.I. would not cut services or change prices. The P.S.I. since February, 1948, has grown to more than 40,000 subscribers and has 3,000 doctors enrolled.

The federal government has just allotted well over half a million dollars from its national health grants to aid hospitals to increase their accommodation. Included is \$26,600 for the Misericordia Hospital, Haileybury, Ont., where the chapel and living quarters are being converted into hospital accommodation, mainly for the obstetrical department. The extra space will provide for 26 beds.

Dr. Angus McKellop reports that there are more than 110 full-time and 220 part-time doctors employed in Canadian industry, and more than 800 registered nurses, with Ontario leading in medical personnel. Ontario's standing compares favourably with that of the United States.

Associated Medical Services Incorporated are discarding their old plan on February 28, 1950, and are substituting their 1,600 and 900 plans. They feel the old plan is too costly and difficult to administer for any considerable number of subscribers. Their experience has compelled them to change their pre-conceived plan and they have concluded it is neither desirable nor economically sound to cover the cost of all medical services through a prepaid plan.

Lieutenant-General Sir Neil Cantlie, K.B.E., C.B., M.C., F.R.C.P., K.H.P., M.B., Director-General of the British Army Medical Services and an Honorary Physician to His Majesty the King, was a recent distinguished visitor to Canada. On Saturday, November 5, the Officers' Mess R.C.A.M.C., Toronto Garrison held a tea for him at 204 St. George St., Toronto.

Mental health services in Ontario are to be extended by enlargements of staff, purchase of new equipment and the training of additional specialists. The expanded services will be financed through federal health grants. Federal funds have been allotted to provide four additional psychiatric social workers for the Toronto Psychiatric Hospital. This hospital has about 2,500 out-patients and 600 in-patients per year. The extra social workers will extend the present social services required for the care and rehabilitation of these patients. Money has also been set aside to buy visual training equipment for the use of students taking postgraduate training in mental health at the Toronto Psychiatric Hospital. NOBLE SHARPE

Dr. E. M. Robertson, Professor of Obstetrics and Gynaecology, Queen's University, addressed the fall meeting of the Ontario County Medical Society at Oshawa. Dr. D. C. L. Bingham, Professor of Surgery also spoke on Intervertebral Disc Disease. These officers were elected: president, Dr. W. H. Stanley, Oshawa; vice-president, Dr. R. Irwin, Port Perry; secretary-treasurer, Dr. F. A. Cuddy, Whitby; executive, Dr. H. C. Moorhouse, Whitby; Dr. T. Orton, Pickering, representative to Physicians' Services Incorporated, Dr. R. W. Graham. The doctors' wives were

MEDICAL HEALTH OFFICERS (Saskatchewan Dept. of Public Health)

*To administer the public health program in a health region
population 50,000 to 75,000*



SALARY RANGE: \$5100-\$6000 per year plus cost-of-living bonus of \$276 per year—annual increase of \$300 until maximum is reached—two additional annual increases of \$300 for those with certification as specialists in public health—three weeks sick leave and three weeks holiday annually with pay, liberal pension scheme.

REQUIREMENTS: Graduation in medicine from a recognized university and graduate training in public health (D.P.H. or M.P.H.)

All applications will receive immediate consideration.

For application forms and additional information apply to:

Public Service Commission
1730 Scarth Street, Regina

entertained by Miss Bourne at Alexandra Residence during the afternoon meeting.

The Provincial Government has granted \$368,000 toward the construction of the new Hospital for Sick Children. This contribution brings to \$1,632,000 the total of provincial grants for the new building. Most of this was authorized at the time of the hospital's first building appeal in 1945. More than one of every three of the hospital's patients comes from outside Toronto; these are the difficult cases requiring lengthy hospitalization. The new hospital will have 632 beds and an entire floor will be devoted to the out-patient department where provision is to be made for handling over 100,000 cases a year.

The Florence Nightingale medal, given by the International committee of the Red Cross has been awarded to Miss Kathleen Russell, director of the school of nursing at the University of Toronto, and chairman of the nursing division of the Canadian Red Cross. The Red Cross financed the school of nursing the first three years before the University took it over in 1923. Miss Russell is the sixth Canadian to receive the Florence Nightingale award, which was instituted in 1912. The others have been: Miss M. Macdonald, matron-in-chief of the C.E.F. in the First War; Miss Vivian A. Tremaine, in charge of Red Cross seaport nursery service, 1922-23; Miss Jean I. Gunn, Toronto General Hospital nursing head and honorary adviser in nursing to Canadian Red Cross, and Miss Jean E. Browne, national director, Junior Red Cross.

Ontario's facilities for the care of the mentally ill are to be expanded over a five year period at a cost of between \$30 and \$50 million. Sites have been chosen for two new hospitals in Northern Ontario of 500 beds each. The Toronto-Hamilton area needs 2,000 more beds and a further 1,000 beds are needed in the Kingston-Brockville area. Among places for the treatment of the mentally defective 300 beds have been added at Orillia and 300 will be ready at Aurora early in the year; about 400 of the 900 beds planned will soon be ready at Smith's Falls. The province at present has 14 mental hospitals and one psychiatric hospital, with 16,328 patients in all.

The first known patient in North America to be cured of filariasis of the eye by the new treatment, hetrazan, developed at the Lederle Laboratories, N.Y., was a United Church missionary from Toronto. She recently returned to Angola, West Africa. She had been absent four years.

For the first time in Canada the population of an entire town is being tested for diabetes. Newmarket was chosen as a representative community. Here Dr. A. J. Kenny from England is leading a small team of workers in this survey. The town council, service clubs and other groups have given voluntary support to the project. Newmarket has a population of about 5,000. The program is being carried out with funds allocated by the federal government to public health research. Begun in mid-October the survey will be completed in March.

A Red Cross Outpost Hospital has been opened at Burks Falls, it has 22 beds, 2 cots and 10 bassinets and is intended to serve the area between Huntsville and North Bay.

The three day refresher course in Obstetrics and Gynecology of the O.M.A. held at Sunnybrook Hospital in November was a great success, 338 registered for the course.

LILLIAN A. CHASE

Quebec

Le Docteur Charles Hébert chef du service de chirurgie de l'Hôpital Notre-Dame et professeur à la faculté de médecine de l'Université de Montréal a été élu président de la Canadian Association of Clinical Surgeons.

Le Docteur Pierre Mallet-Guy professeur de Pathologie chirurgicale à la faculté de Médecine de l'Université de Lyon a donné récemment à Québec et à Montréal une série de cours sur la pathologie de la vésicule et les pancréatites chroniques.

Le Docteur Lyman Duff directeur de l'Institut Pathologique de l'Université McGill a été élu Doyen de la même université en remplacement du Docteur F. Smith, décédé récemment.

Le 13e Congrès de la société internationale de chirurgie a été tenu en octobre dernier à la Nouvelle-Orléans. Les Docteurs François Roy, Gustave Auger, H. Beaudet, A. Pettigrew de Québec; Charles Bohémier, Charles Hébert, Edouard Gagnon, Jean-Paul Legault et Edouard Desjardins de Montréal y ont pris part. A cette occasion les docteurs Gagnon, Hébert et Desjardins ont été reçus membres de cette société. La plupart de ces médecins se sont ensuite rendus à Chicago pour assister au Congrès de l'American College of Surgeons.

On annonce la formation d'un Institut du Cancer à l'Université Laval Sous la présidence du doyen de la faculté de médecine, le docteur Charles Vézina.

Les Docteurs Claude Bertrand et André Parenteau ont pris part au Congrès de la Neuro-Surgical Society of America à Québec en octobre.

Les Docteurs Maurice Bélisle et André MacKay de l'Hôpital Notre-Dame ont passé avec succès les examens d'agrégation du Collège Royal du Canada. Les Docteurs Léon Béique, Roger Champoux, Marcel Lamoureux, Laurent Archambault de la même institution ont fait de même en chirurgie.

Le Docteur Lucien Coutu a obtenu une bourse de la Canadian Life Insurance Officers of America pour étudier la pathogénie des maladies cardio-vasculaires à l'Institut de Chirurgie et Médecine expérimentales de l'université de Montréal.

YVES PRÉVOST

Saskatchewan

Dr. Geoffrey T. Mann (M.D., LL.B.), formerly of Regina, has been appointed Chief Medical Examiner for the State of Virginia. He has also been appointed Head of the Department of Legal Medicine at the Medical College of Virginia, and Chairman of the Division of Accounting, Law and Statistics, School of Hospital Administration, Medical College of Virginia. Dr. Mann formerly practiced in Saskatchewan and was also medico-legal adviser of the Saskatchewan Government Insurance Company.

Dr. and Mrs. Mann and daughter now reside in Richmond, Virginia.

Dr. J. E. Leddy, formerly in Ontario, has returned to Saskatchewan and is practising at 605 Canada Building, Saskatoon and Dr. D. S. Bruce has also returned to the province to practise at Lampman.

INSULIN

PROTAMINE ZINC INSULIN

In treatment of diabetes mellitus it is frequently necessary to supplement control of diet and exercise by the regular use of Insulin or Protamine Zinc Insulin.

INSULIN-TORONTO — 10-cc. vials; 40 and 80 units per cc.

Made from Zinc-Insulin Crystals
Rapid Effect — Short Duration

PROTAMINE ZINC INSULIN — 10-cc. vials; 40 and 80 units per cc.

Comparatively Slow Effect — Prolonged Duration



CONNAUGHT MEDICAL RESEARCH LABORATORIES
University of Toronto Toronto 4, Canada

Changes within the province are Dr. Z. B. Claman, formerly of Herbert, now practising at Swift Current and Dr. H. I. Ashley, formerly at Watson, now practising at Cupar.

The Department of National Health and Welfare has announced two grants for assistance in construction at the St. Therese Hospital, Tisdale, for the provision of space for 16 additional beds and the provision of an additional 20 beds and more space for administrative offices and other services at the Victoria Hospital at Prince Albert.

G. G. FERGUSON

General

The International Society of Haematology will hold its Biennial Congress at the University of Cambridge, Cambridge, England from August 21 through 26, 1950. The program committee is in the process of receiving titles for papers and scientific exhibits to be presented at the Congress. Material to be submitted for consideration for the program may be sent to Dr. I. Davidsohn, Mt. Sinai Hospital, Chicago, Illinois, or Dr. S. Mettler, University of California, San Francisco, California. Those desiring to present scientific exhibits should make application as soon as possible.

The Canadian Cancer Society has announced establishment of medical fellowships in memory of the late Dr. Allan Blair of Regina. The fellowships are for study of the diagnosis and treatment of cancer. Each of the two fellowships has a value of \$4,000 per year for two years. The first becomes available July 1, 1950, the second July, 1951, and in rotation thereafter. Applicants, in addition to a medical degree, must have not less than three years of postgraduate study, of which at least two shall have been in a field related to the diagnosis or treatment of cancer. According to the conditions which have been established, fellows shall express a firm interest and assume the moral obligation to practice his or her profession subsequently in Canada with a particular interest in cancer.

The University of Toronto Medical School is holding two courses during the month of January. From January 9 to 14 inclusive there will be a refresher course in ophthalmology and otolaryngology. From January 26 to 28, inclusive, a course for general practitioners will be held at the Toronto Western Hospital, and the Hospital for Sick Children (See advertising section page 33).

The First International Cardiovascular Congress will be held in Paris, France, September 3 to 6, 1950. Cardiologists from all parts of the world will attend, and registration should be arranged as early as possible (See advertising section page 32).

The American Society for the Study of Sterility is offering an Annual Award of \$1,000 known as the Ortho Award for an Essay on the result of some clinical or laboratory research pertinent to the field of sterility. Competition is open to those who are in clinical practice as well as to individuals whose work is restricted to research in basic fields or full-time teaching positions. Full particulars may be obtained from the Secretary, Dr. Walter W. Williams, 20 Magnolia Terrace, Springfield, Massachusetts. Essays must be in his hands by April 1, 1950.

The Annual Meeting will be held at the Sir Francis Drake Hotel, San Francisco, California, June 24 and 25, 1950.

Book Reviews

Clinical Cystoscopy. L. E. McCrea, Clinical Professor of Urology, Temple University Medical School. Vol. I. 677 pp. Vol. II. 657 pp., illust., 2nd ed. \$28.00. F. A. Davis Company, Philadelphia, 1949.

The second edition of this treatise on urology embraces the latest and most recent additions of the specialty. The two volumes are profusely illustrated with photographs and artists' paintings of the cystoscopic appearance of bladder lesions, and there are very few of these that an urologist has encountered which will not be found in the two books. Though the books are built around the cystoscope and cystoscopic findings, there are chapters in which the cystoscope plays a minor rôle, as in congenital anomalies and neurogenic bladder, yet these chapters are as informative as any to be found in a modern textbook on urology. In the chapter on prostatic hypertrophy, which is excellently illustrated, the part played by the cystoscope in the selection of the operative procedure to be employed is duly emphasized, and serves as a guide to the urologist. The books are easy to read and unnecessary terminology is eliminated wherever feasible. The bibliography at the end of each book includes nearly everything that has been published relating to the chapters under discussion, and help the student to further reading of any topic desired. The book should appeal to the intern and resident in urology, and to the urologist who will find his cystoscopic visions translated into pathological entities.

Clinical Radiation Therapy. I. I. Kaplan, Clinical Professor of Radiology, New York University Medical College. 844 pp., illust., 2nd ed. \$15.00. Paul B. Hoeber, Inc., New York, 1949.

Dr. Kaplan has revised his well known textbook, and it is a valuable contribution to the field of radiation therapy. Radiation physics, and complications and injuries associated with x-ray and radiation therapy are adequately described. Explicit directions for almost all suitable benign and malignant lesions are thoroughly described. The major portion of the book is devoted to a detailed description of the treatment of benign and malignant conditions by x-ray and radium therapy. Dr. Kaplan outlines the treatment of many benign diseases which many radiologists no longer consider suitable for irradiation. Unfortunately, radium dosages are generally given in milligram-hours, rather than in gamma roentgens. Tumour and skin dosages in malignant conditions are not stressed sufficiently. This book will be a valuable addition to the library of qualified radiologists.

Muscles—Testing and Function. H. O. Kendall and F. P. Kendall, Physical Therapy Department, Children's Hospital School, Baltimore, Maryland. 278 pp., illust. \$7.50. The Williams and Wilkins Co., Baltimore, 1949.

This volume presents a detailed account of muscle testing procedures and of the functional significance of muscle weakness and contractures. It is based on 25 years of experience in the physiotherapy department of The Children's Hospital School in Baltimore, Maryland. The fundamental principles in manual muscle testing are reviewed. Extensive nerve and muscle charts for recording the results of examination are presented. Following this the methods of testing individual muscles, the extremities, trunk, face, neck and throat muscles are presented. Each muscle is taken individually. The outstanding feature of the book is the beautiful illustrations which clearly outline the method of testing as well as the brief but lucid description. The volume should be extremely valuable to physiotherapists and orthopaedic surgeons and others interested in muscle testing and their function. It is to be highly recommended.

Continued on page 31

Books Received

Continued from page 108

Books are acknowledged as received, but in some cases reviews will also be made in later issues.

The Pharmacology and Toxicology of Uranium Compounds. Part I. Edited by C. Voegtlin, formerly Chief, Division of Pharmacology, National Institute of Health, U.S. Public Health Service; and H. C. Hodge, Professor of Pharmacology and Toxicology, University of Rochester School of Medicine and Dentistry. 524 pp., illust. \$12.50. Part II, 560 pp. McGraw-Hill Book Company, Inc., New York, Toronto and London, 1949.

Epilepsy and Convulsive Disorders in Children. E. M. Bridge, Research Professor of Paediatrics, School of Medicine, University of Buffalo. 670 pp., illust. \$9.35. McGraw-Hill Book Company, Inc., New York, Toronto and London, 1949.

Practice of Orthopaedic Surgery. T. P. McMurray, Professor of Orthopaedic Surgery, Liverpool University. 444 pp., illust., 3rd ed. \$7.50. Edward Arnold & Co., London; Macmillan Co. of Canada Ltd., Toronto, 1949.

Cystoscopy and Urography. J. B. Macalpine, lately Honorary Surgeon and Surgeon in Charge of the Genito-urinary Department, Salford Royal Hospital. 554 pp., illust., 3rd ed. \$15.75. John Wright & Sons Ltd., Bristol; Macmillan Co. of Canada Ltd., Toronto, 1949.

Textbook of Surgery. P. Kiely, Professor of Surgery, University College, Cork. 1184 pp., illust. 45s. H. K. Lewis & Co., Ltd., London, 1949.

Marihuana in Latin America—the Threat it Constitutes. P. O. Wolff, Member of Expert Committee on Habit Forming Drugs of the World Health Organization. 56 pp. \$1.50. Sponsored by Washington Institute of Medicine. The Linacre Press, Inc., Washington, 1949.

Human Helminthology. E. C. Faust, The William Vincent Professor of Tropical Diseases and Hygiene, Head of the Division of Parasitology, Department of Tropical Medicine and Public Health, The Tulane University of Louisiana, New Orleans, Louisiana. 744 pp., illust., 3rd ed. \$11.25. Lea & Febiger, Philadelphia; Macmillan Co. of Canada Ltd., Toronto, 1949.

Nervous and Neurohumoral Regulation of Intestinal Motility. W. B. Youmans, Professor of Physiology, University of Oregon Medical School. 129 pp., illust. \$4.75. Interscience Publishers, Inc., New York, 1949.

Continued on page 36

The Royal College of Physicians and Surgeons of Canada

ANNOUNCEMENT OF ANNUAL AWARDS

Two annual awards, "The Royal College of Physicians of Canada Medal" and "The Royal College of Surgeons of Canada Medal" are offered to Canadians for the best original works in the basic sciences, or in clinical research, in Medicine and in Surgery.

The purpose of these awards is to stimulate investigative work by young men. An age limit of 40 years has therefore been imposed. The recipients of the awards shall be invited to present their essays at the Annual Meeting of the College.

Nominations for the awards, accompanied by manuscripts, may be made only by Fellows of the College and should reach the College office not later than April 1, 1950. Candidates intending to compete for the awards should obtain from the Secretary's office details regarding length and type of manuscript.

No award shall be made if, in the opinion of the Council of the College, the work is not of sufficient merit.

For further information, address:

The Honorary Secretary, 150 Metcalfe Street,
Ottawa, Canada

IMPORTANT NEW BOOKS FROM ENGLAND

Operative Obstetrics

By J. M. Munro Kerr and J. Chassar Moir. Completely Revised Fifth Edition, 1949.

As in previous editions of this famous book, the authors give a reasoned discussion of the problems of dystocia and the complications of childbirth. \$12.00

Green's Manual of Pathology

Revised by H. W. C. Vines, M.A., M.D., Professor of Pathology, University of London.

New 17th Edition, 1949, with many new illustrations. \$8.00

THE MACMILLAN COMPANY
OF CANADA LIMITED

70 BOND STREET TORONTO 2, ONT.



New Books in Roentgenology

ROENTGEN DIAGNOSIS OF THE EXTREMITIES AND SPINE

By Albert B. Ferguson, Boston University. Vol. XVII, Annals of Roentgenology. 519 pages, 633 plates, revised second edition, 1949. \$18.00.

CLINICAL ROENTGENOLOGY OF THE HEART

By John B. Schwedel, New York. Vol. XVIII, Annals of Roentgenology. 380 pages, 749 illustrations, revised third printing, 1948. \$15.00.

ROENTGEN DIAGNOSIS OF DISEASES OF THE SKULL

By Max Ritvo, Harvard Medical School. Vol. XIX, Annals of Roentgenology. 409 pages, 466 illustrations, 1949. \$19.25.

Write for our Catalogue of Medical Books

THE RYERSON PRESS
TORONTO

JOURNAL OF Canadian Medical Association

Editorial offices—3640 University St., Montreal
General Secretary's office—135 St. Clair Ave. W., Toronto

Subscription rates: The Journal is supplied only to paid up members of the Canadian Medical Association with the following exceptions: for medical libraries, hospitals and doctors residing outside of Canada, the annual subscription is \$10.00; for medical students residing in Canada there is a special rate of \$2.50 per annum. All subscriptions and related correspondence should be addressed to the General Secretary's office at 135 St. Clair Avenue West, Toronto 5, Ontario.

Contributors: Articles are accepted on condition that they are contributed solely to this *Journal*. Material contributed to this *Journal* is covered by copyright, and permission must be obtained for its reproduction either in part or in whole.

Manuscripts must be typewritten, double spaced, and the original copy.

References: in the case of a journal arrange as follows: author (JONES, A. B.), title, journal, volume, page, year. In the case of a book: WILSON, A., Practice of Medicine, Macmillan, London, 1st ed., p. 120, 1922.

Illustrations: A limited number will be accepted.

Photographs should be clear: drawings should be in india ink on white paper. All unmounted. Legends to be typed separately.

Reprints: May be ordered upon forms sent with galley proofs.


ADVERTISEMENTS

Advertising copy, layout and cuts should be sent direct to Murray Printing Co., 192 Spadina Ave., Toronto 2-B to reach Toronto by the 10th of the month preceding date of issue.

Classified ads: Send copy to Canadian Medical Association, 3640 University Street, Montreal, not later than the fifteenth of the month previous to issue.

Rates: \$2.50 for each insertion of 40 words or less, additional words 5c each.

News: The Editor will be glad to consider any items of news that may be sent in by readers.



"MY BANK"
TO A MILLION CANADIANS

B of M

CANADA'S FIRST BANK

BANK OF MONTREAL

*working with Canadians in
every walk of life
since 1817*

Classified Advertisements

ANNOUNCEMENT: FIRST INTERNATIONAL CARDIO-VASCULAR CONGRESS, September 3 to 9, 1950, Paris, France. Those planning to attend should register as early as possible. Registration fee for each member of Congress is \$20.00; for guest accompanying Congressist \$10.00. Money should be sent to: 1er Congrès International de Cardiologie; mail addressed to: Mme. Claire Soullé, Secrétaire Administratif, 78 rue de l'Abbé-Groult, Paris (15e), France. Those in Canada who propose making scientific contributions at meetings of Congress should send title and summary of communications to Secretary of Canadian Heart Association: Dr. Harold N. Segall, 1538 Sherbrooke St. W., Montreal, Que.

INTERNSHIP IN ANÆSTHESIA.—Applications will be received from graduates of approved medical schools for internship in the Department of Anæsthesia, Royal Victoria Hospital, Montreal. One year of approved internship is a pre-requisite. Term of service either one or two years from the date of appointment. Salary and maintenance. Appointments begin June 1, July 1, and August 1, or earlier. A wide experience in the various techniques is afforded. Address applications to: The Superintendent, Royal Victoria Hospital, Montreal 2, Quebec.

POSITION VACANT.—Dalhousie University invites applications for the position of Professor of Pharmacology. Applicants should preferably be medically qualified with teaching experience. Salary from \$5,000 to \$5,500 according to training and experience. The University makes provision for annuity and group insurance. Applications together with credentials should be sent to H. G. Grant, Dean, The Faculty of Medicine, Dalhousie University, Halifax, Nova Scotia.

POSITION VACANT.—Physician with graduate training in Public Health to divide time between administrative duties in a city health department and teaching of public health and preventive medicine to undergraduate medical students. City of 300,000 in Southern U.S.A. Apply to Box 817, Canadian Medical Association Journal, 3640 University Street, Montreal.

POSITION VACANT.—An energetic young doctor needed for general practice in British Columbia town in Canadian Rockies, licensed to practice in British Columbia, car essential. Suitable residence if required. Good opportunity for advancement. Apply stating age, nationality, religion, medical school and year graduate. Starting at \$400 per month. The Banff Clinic, Banff, Alberta.

POSITION VACANT.—Is there a Medical Man who needs more outdoor activities, who might be interested in joining our organization as a representative on a commission basis? We are handling a top line of X-ray, supplies and service and have need of medical men to contact the profession. If you are interested, contact W. R. Thompson, Eastern Medical Equipment Ltd., 506 Bloor Bldg., 57 Bloor Street West, Toronto, MI. 4918.

POSITION VACANT.—Medical Officers: Pensionable or contract vacancies exist Islands, Fiji, Solomons, Gilbert and Ellice, Samoa, Cook, Tonga. Enquire airmail Inspector-General, South Pacific Health Service, Suva, Fiji.

POSITION VACANT.—A municipal physician is required to serve approximately 1,000 people in the Rural Municipality of Blanshard at Oak River, Manitoba. Salary \$5,000 and modern eight room house. Anglo-Saxon community 10 miles from Hamiota Hospital. Duties to commence as soon as possible. A. T. Russell, Sec.-Treas., Oak River, Manitoba.

POSITION VACANT.—Pædiatric residency for one year term, available December 15, 1949, Children's Hospital, Vancouver, B.C. 100-bed hospital drawing patients from entire Province offers good training in all branches of pædiatrics. Large active out-patient department and extensive surgical service. Modern buildings with complete facilities for caring for all illnesses in childhood. Furnished accommodation available, single or married. Remuneration \$80.00 per month plus \$15.00 meal allowance plus \$17.00 cost-of-living bonus. Apply Administrator, Children's Hospital, 250 West 59th Avenue, Vancouver, British Columbia.

POSITION VACANT.—Resident doctors urgently needed for United Church Hospitals at Queen Charlotte City, and Hazelton, British Columbia. Good openings for younger men. Enquire of Rev. George Dorey, D.D., 299 Queen Street West, Toronto, Ontario, or Rev. W. P. Bunt, 505 Dunsmuir Street, Vancouver, B.C.

POSITION VACANT.—Assistant radiologist, certified or pending certification, with prospect of entering into partnership in two years. Practice consists of private office with excellent equipment and enviable hospital appointments in diagnosis and therapy. State qualifications, including age and personal details with name of reference. Replies confidential. Apply to Box 820, Canadian Medical Association Journal, 3640 University Street, Montreal.

Plan Now To Attend The

SIXTH ANNUAL CLINICAL CONFERENCE **CHICAGO MEDICAL SOCIETY**

February 28, March 1, 2 and 3, 1950

PALMER HOUSE

CHICAGO, ILLINOIS

A four day meeting planned to keep you abreast of the latest developments in scientific medicine.

A group of outstanding men will present an excellent scientific program.

COLOR TELEVISION will be beamed from one of Chicago's large hospitals direct to the Palmer House.

Many instructive scientific and technical exhibits.

« « Make your reservations direct with the Palmer House » »

• 1850 • THE ONE HUNDREDTH ANNIVERSARY OF THE CHICAGO MEDICAL SOCIETY • 1950 •

THE NEW YORK POLYCLINIC MEDICAL SCHOOL AND HOSPITAL

(ORGANIZED 1861)

(The Pioneer Post-Graduate Medical Institution in America)

SYMPOSIUM ON OTOLARYNGOLOGY — OPHTHALMOLOGY

Five Days — April 17 - 21, 1950

A review of recent advances in the diagnosis and treatment of the more common disorders in the fields of Otolaryngology and Ophthalmology, comprising lectures, motion pictures and demonstrations in the clinics, operating rooms and dissecting room. Guest speakers and members of our staff will participate. Fee, \$50.00. Limited class.

SYMPOSIUM FOR SPECIALISTS

A full time course of five days' duration. A review of recent advances in Dermatology and Syphilology, consisting of lectures and demonstrations, discussion of the rarer dermatoses with lantern slide illustrations.

SYMPOSIUM ON DERMATOPATHOLOGY

A full time course of five days' duration, comprised of didactic lectures, microprojection of illustrative material and study of microscopic slides under supervision.

FOR INFORMATION ADDRESS

MEDICAL EXECUTIVE OFFICER, 345 West 50th St., New York City 19

PUBLIC HEALTH AND RELATED FIELDS

Federal grants now being made to Provincial Departments of Health permit of extending health services. Financial assistance in postgraduate study is being given by Provincial Departments of Health to certain candidates.

Diploma in Public Health

In addition to the regular courses of instruction, provision has been made for suitably qualified candidates to receive the basic training in public health and also to prepare for appointments in special fields including:

PUBLIC HEALTH NUTRITION • PUBLIC HEALTH EDUCATION ADMINISTRATION OF MEDICAL CARE

There are provided, also, courses of instruction leading to the *Diploma in Industrial Hygiene*.

Diploma in Hospital Administration

A postgraduate course in hospital administration for graduates in medicine and also for other university graduates who have acceptable academic standing, experience and aptitude, providing one session of nine months and twelve months of supervised hospital experience as an intern in hospital administration.

For further information, address

**The Director, School of Hygiene
University of Toronto, Toronto 5, Ontario**

POST GRADUATE STUDY

For Canadian and U.S.A. Practitioners

Are you preparing for any Medical, or Surgical Examination?

Send Coupon below for valuable publication

"GUIDE to MEDICAL EXAMINATIONS" PRINCIPAL CONTENTS

The F.R.C.S. England and Edinburgh.
The F.R.C.P. & S. of Canada and Certification Exams.
The M.R.C.P. London and Edinburgh.
Diploma in Anaesthetics.
The Diploma in Tropical Medicine.
Diploma in Ophthalmology.
Diploma in Psychological Medicine.
Diploma in Child Health.
Diploma in Physical Medicine.
Diploma in Public Health.
Diploma in Laryngology.

You can prepare for any of these qualifications by postal study at home and come to Great Britain for examination. We specialize in Post-graduate tuition. Courses for all Canadian and U.S.A. qualifications.

THE SECRETARY MEDICAL CORRESPONDENCE COLLEGE

19 Welbeck Street,
London, W.1.

*Str.—Please send me a copy of your
"Guide to Medical Examinations"
by return.*

Name

Address

Examinations in which interested.....
C.M.A.

Books Received

Continued from page 31

Photoelectric Methods in Clinical Biochemistry. G. E. Delory, Assistant Professor of Biochemistry, University of Manitoba. 90 pp., illust. 15s. Hilger & Watts, Ltd., London.

Aviation Medicine. K. G. Bergin, British Overseas Airways Corporation. 447 pp., illust. \$8.75. John Wright & Sons Ltd., Bristol; Macmillan Co. of Canada, Toronto, 1949.

Arterial Hypertension. I. H. Page and A. C. Corcoran, Research Division of the Cleveland Clinic Foundation, Cleveland. 400 pp., illust., 2nd ed. \$5.00. Year Book Publishers, Inc., Chicago, Ill.

Diseases of Women. Edited by C. White, F. Cook and Sir William Gilliatt. 461 pp., illust., 8th ed. \$6.25. Edward Arnold & Co., London; Macmillan Co. of Canada, Toronto, 1949.

Acute Injuries of the Head. G. F. Rowbotham, late Hunterian Professor of Surgery and Dickinson Scholar. 480 pp., illust., 3rd ed. \$8.75. E. & S. Livingstone Ltd., Edinburgh; Macmillan Co. of Canada, Toronto, 1949.

Continued on page 81

H. K. LEWIS & Co. Ltd.

**MEDICAL PUBLISHERS and BOOKSELLERS
LARGE STOCK OF WORKS ON
MEDICINE AND GENERAL SCIENCE
of all Publishers.**

SECONDHAND DEPT.: 140 Gower Street, London, W.C.1.

A constantly changing large stock of Medical and Scientific Literature. Books sought for and reported free of charge. Please write for lists, stating interests.

LONDON: 136 GOWER STREET, W.C.1

CABLEGRAMS:—PUBLICAVIT WESTCENT—LONDON

The University of Michigan Medical School Postgraduate Courses — 1950

Brief Review Courses for Graduates in Medicine

Internal Medicine	
Diseases of the Gastro-Intestinal Tract.....	March 13-17
Diseases of the Heart.....	March 20-24
Rheumatic Disease	March 27-29
Recent Advances in Therapeutics.....	March 30-April 1
Endocrinology and Metabolism.....	April 3-7
Diseases of the Blood and Blood-Forming Organs	April 10-14
Allergy	April 17-21
Electrocardiographic Diagnosis.....	August 28-September 2
Neurology	May 8-11
Ophthalmology	April 24-26
Pediatrics	April 12-14
Roentgenology, Diagnostic	April 17-21

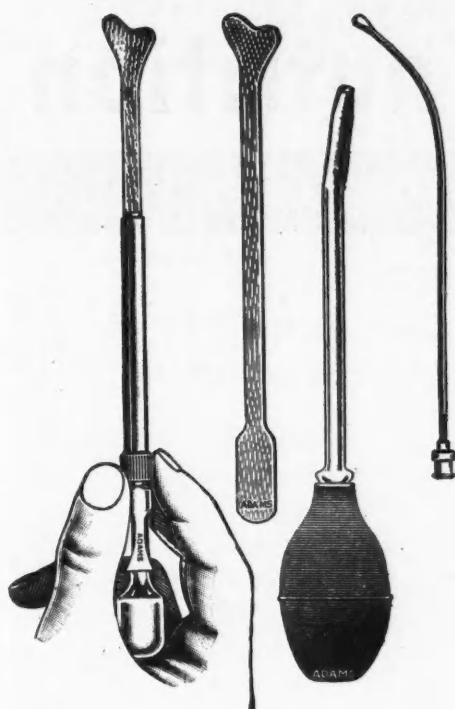
For further information write to

Howard H. Cummings, M.D., Chairman,
Department of Postgraduate Medicine, Room 2040,
University Hospital, Ann Arbor, Michigan.

POSITION VACANT

Capable, energetic Canadian physician to organize and develop new Medical Department for Merck & Co. Limited, Montreal. Duties include the Development of Clinical Research Programs in Canada and supervision of Medical Literature. Written applications with references should be sent to Department "M", Merck & Co. Limited, 560 De Courcelles Street, Montreal. State Medical School attended, age, salary expected and date available.

Your office is a cancer detection center



One of the simple, effective, office procedures which can be followed routinely for the detection of early uterine cancer is the taking of smears, "surface biopsy" scrapings, etc.^{1, 2} This can be done by any trained doctor, nurse or technician, and the smears then sent to a laboratory specializing in cytological diagnosis. The glycerine mailing technic of Ayre and Dakin³ offers a simple method of sending the samples to the laboratory.

Cytology interpretation is highly specialized and requires the experienced judgment of cytologists specially trained in the field. The names of qualified cytological laboratories in your area can be obtained from the pathologist at your local hospital, your local cancer clinic or the local unit of the American Cancer Society.

Clay-Adams Uterine Cancer Cytology Kits include all materials needed for taking cytology samples and mailing them to the laboratory.

A-2257 Physicians' Uterine Cancer Cytology Outfit, including 4 dozen Ayre's "Surface Biopsy" Scrapers, 2 Vaginal Pipettes, 1 Aspirator Bulb, 1/2 gross Rite-On Slides, 2 dozen Two-Slide Mailers with envelopes; with directions.

Accessories { A-2265 Holder for Ayre's Scrapers.
A-2266 Cary Metal Uterine Cannulas, malleable.

1. G. N. Papanicolaou, M.D., and H. F. Traut, M.D.: "Diagnosis of Cancer by the Vaginal Smear," 1943, Commonwealth Fund.
2. J. E. Ayre, M.D.: "Selective Cytology Smears for Diagnosis of Cancer," *Am. J. Obst. & Gynec.*, 53: 609-617, 1947.
3. J. E. Ayre, M.D., and E. Dakin: "Cervical Cytology Tests in Cancer Diagnosis: Glycerine Technic for Mailing," *Canad. M. A. J.*, 54: 489-491, 1946.

CLAY-ADAMS COMPANY, INC.

141 EAST 25th STREET ; NEW YORK 10

Showrooms also at 308 West Washington Street, CHICAGO 9, ILL.



Order from your Surgical Supply Dealer

Books Received

Continued from Page 36

Clinical Biochemistry. A. Cantarow, Professor of Biochemistry, Jefferson Medical College; and M. Trumper, Commander, H(S), U.S.N.R. 642 pp., 4th ed. \$8.75. W. B. Saunders Co., Philadelphia and London; McInsh & Co. Ltd., Toronto, 1949.

Oral Bacterial Infection. L. Streen, Director of Research Novocol Chemical Mfg. Co., Inc., Brooklyn, N.Y. 185 pp., illust. Dental Items of Interest Publishing Co. Inc., Brooklyn, N.Y., 1949.

Pollen Slide Studies. G. T. Brown, Instructor in Clinical Medicine, Georgetown University School of Medicine. 122 pp., illust. \$8.00. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1949.

Streptomycin and Dihydrostreptomycin in Tuberculosis. Edited by H. M. Riggins and H. C. Hinshaw. 554 pp., illust. National Tuberculosis Association, 1949.

Urological Aspects of Spinal Cord Injuries. G. C. Prather, Department of Genito-Urinary Surgery, Harvard Medical School, Boston. 143 pp., illust. \$5.25. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1949.

The National Health Service Act in Great Britain. A Review of the first year's working. Edited by Sir Heneage Ogilvie, W. A. R. Thomson and R. M. Stecher. 108 pp. \$2.00. Published by The Practitioner Limited, London, 1949.

Mental Hygiene in Public Health. P. V. Lemkau, Associate Professor of Public Health Administration and Director of the Mental Hygiene Study, School of Hygiene and Public Health, The Johns Hopkins University. 396 pp., illust. \$5.45. McGraw-Hill Company of Canada Ltd., Toronto, 1949.

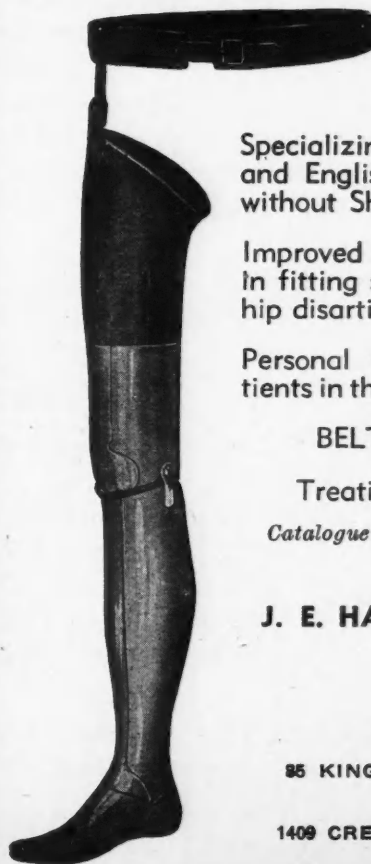
Isotopic Tracers and Nuclear Radiations with Applications to Biology and Medicine. W. E. Siri, et al. 653 pp., illust. \$16.25. McGraw-Hill Company of Canada Ltd., Toronto, 1949.

Textbook of Physiology. J. F. Fulton (Editor), Sterling Professor of Physiology, Yale University School of Medicine. 1258 pp., illust., 16th ed. \$11.00. W. B. Saunders Co., Philadelphia and London; McInsh & Co. Ltd., Toronto, 1949.

Atomic Medicine. Edited by C. L. Behrens, Director, Atomic Defence Division, Bureau of Medicine and Surgery, Navy Department. 416 pp., illust. \$7.50. Thomas Nelson & Sons, Edinburgh, New York and Toronto, 1949.

Iron Metabolism and Its Clinical Significance. A. Vannotti, Director, Medical Polyclinic and Professor of Internal Medicine, University of Lausanne; and A. Delachaux, Lector in the Medical Polyclinic, University of Lausanne. Translated by E. Pulay. 267 pp. 32-. Frederick Muller Ltd., London, 1949.

ARTIFICIAL LIMBS



It is our policy to consult Surgeon before soliciting patient.

Specializing on light Dural Metal and English Willow Limbs worn without Shoulder Straps.

Improved and successful method in fitting short thigh stumps and hip disarticulations.

Personal training given to patients in the use of Hanger Limbs.

BELTS, LEG BRACES

Treatise on amputations.

Catalogue and demonstration given on request.

J. E. HANGER OF CANADA Limited

Head Office established 1861

85 KING ST. WEST, TORONTO
Phone EL 5797

1409 CRESCENT ST., MONTREAL
Phone LA 9810

A REPORT on new clinical research in infant nutrition

BY SWIFT'S — PIONEERS OF MEATS FOR BABIES

To further scientific knowledge and determine more precisely the role of meat in the infant's diet, the following studies have been or are now being conducted as part of a continuing program, through grants-in-aid made to various universities and research institutions by Swift's.

THE EFFECT OF MEAT IN THE DIET OF INFANTS AND YOUNG CHILDREN

Results of this study indicate that meat promotes hemoglobin and erythrocyte formation. These findings were revealed in a preliminary report published in the J.A.M.A.* The present studies are a continuation of the work reported in this article.

*J.A.M.A. 134 1215 (1947)

STUDIES ON THE UTILIZATION OF THE NUTRIENTS IN STRAINED MEATS BY PREMATURE INFANTS

These studies were designed to compare the utilization by premature infants of the nutrients in milk, meat-supplemented milk, and milk-substitute diets. The balance method is being used to determine the utilization of calcium, phosphorus, iron, fat and nitrogen.



THE NUTRITIONAL VALUE OF CALCIUM-ENRICHED MEAT AS COMPARED WITH THAT OF MILK

From this research has evolved a milk substitute for infants and children who are allergic to milk or who for any other reason are unable to include milk in their diets. The milk substitute consists of Swift's Strained Meat supplemented with calcium and phosphorus salts, carbohydrate, fat and certain vitamins. Published results** show that the calcium, phosphorus and protein are utilized as well as these same nutrients in milk.

**Proc. Soc. Exptl. Biol. Med., 65, 120 (1947)